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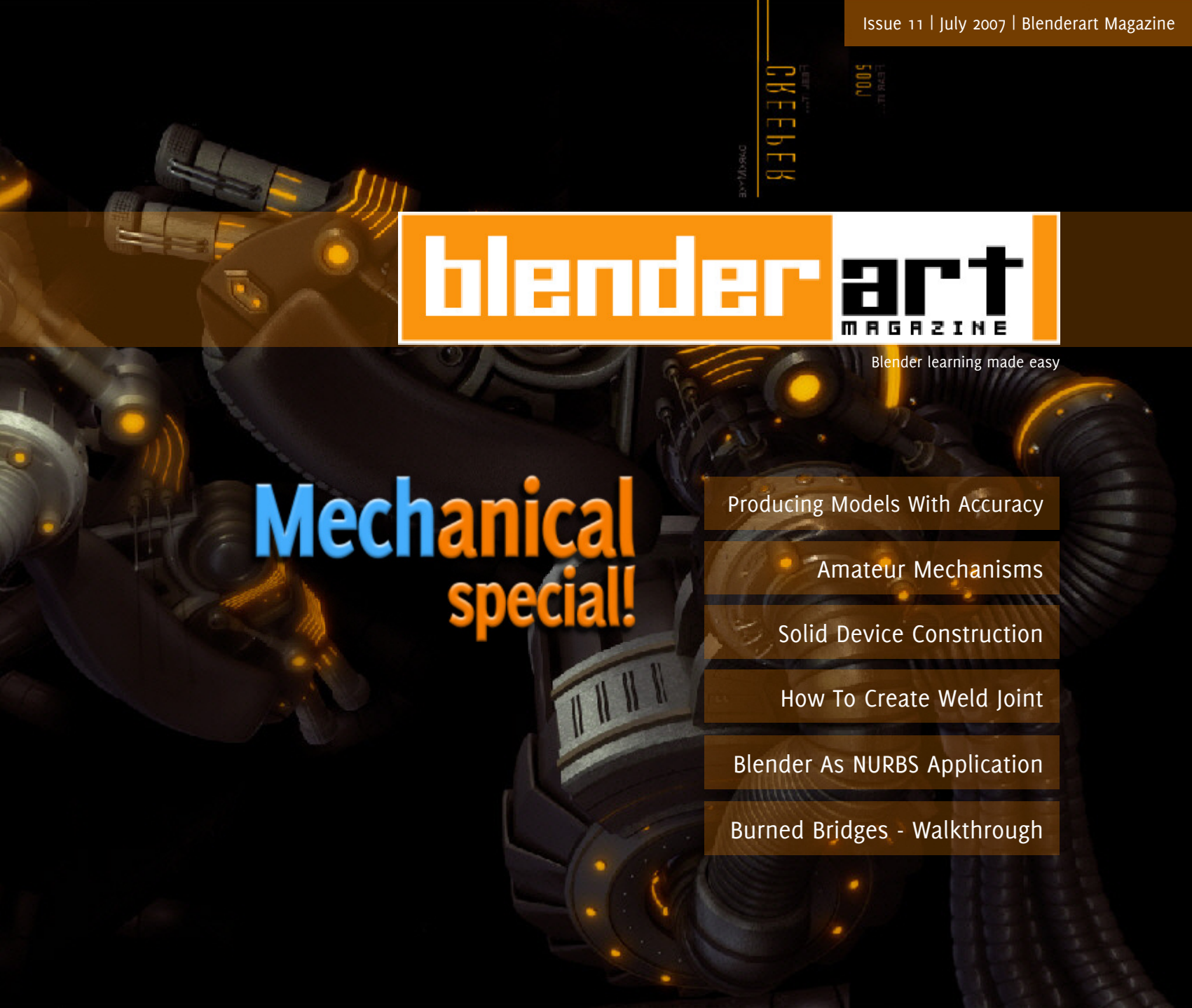

blender art MAGAZINE

Blender learning made easy

Mechanical special!

- Producing Models With Accuracy
- Amateur Mechanisms
- Solid Device Construction
- How To Create Weld Joint
- Blender As NURBS Application
- Burned Bridges - Walkthrough

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I don't think most of us give much thought to how Much of our world is actually Mechanical at this point

When I think of Mechanical modeling, I generally envision robots and futuristic objects. But that is just a small subsection of Mechanical Modeling and overlooks the growing field of modelers using Blender for product design and prototyping, as well as our large number of car modelers. In fact Mechanical modeling encompasses everything that is not organic. Somewhat of a no-brainer statement, but true, none the less.

I don't think most of us give much thought to how much of our world is actually mechanical at this point. Or how it got built and in use to the point that we no longer give it much thought.

Well, it started with ideas that were tested, built, then were put into practice. There have been programs around for some time that have become industry standards. And lately Blender has been making an impact on these work-flows.

Blender is a great program to experiment with your ideas. Not only can you design the next new marvel, you can also animate it and see how it would actually work.

While Mechanical modeling in Blender can be at times cumbersome, new features and tools are making it easier all the time, as the articles and tutorials in this issue will show. To that end, we have gathered together a nice variety of articles/tutorials showing some tips and tricks to creating Mechanical models with blender.

I hope you enjoy and learn as much as I have from this issue.

Happy Blending!
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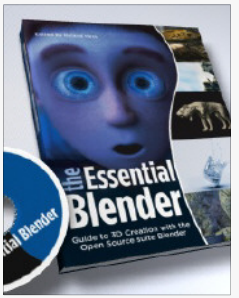
Where's the Magic 'Light it Up Perfectly' Button?

Izzy don't know squat about lighting. Well that is not quite true, she has a good understanding of lighting theories, she has read and done every tutorial on lighting she could find and yet her images still look poorly lit. In fact she would give just about anything to any coder that would add a 'Light it Up Perfectly' Button and has gone so far as to highly consider hiring someone to light all her images and scenes for her.

Sound familiar? It should. The greater majority of us have problems getting our lighting to do what we want. And unfortunately, there is no magic button or even a 'one size fits all' lighting solution. Lighting is and always will need to be customized to whatever you are lighting. Bummer deal for those of us that can't ever quite get it right.

But luckily for Izzy and the rest of us, 'The Essential Blender" has an entire chapter devoted to lighting. With a series of simple to follow exercises/examples, the writer explains how simple it is to actually use blender's lighting tools. (Izzy has already learned quite a bit of new info).



Each lamp type is fully explained as well as several lighting setups. An in depth section covers the standard 3 point lighting setup as well as tips and tricks to get the most out of it. Once you have completed the tutorial section, there is also an in depth reference section for current or future use.

After reading this chapter, while I still find myself wishing for my 'magic lighting button', at least now I have a better understanding of blender's lamps and how to use them more effectively.

Blender Conference 2007

Call For Proposals

It's has been five years since Blender became Open Source, and to showcase all of our achievements and pave the way for the next 5 years, the Blender Foundation is pleased to launch a call for proposals for the Blender Conference 2007, to be held October 12-14, 2007 at the new venue De Zwijger in Amsterdam, the Netherlands.

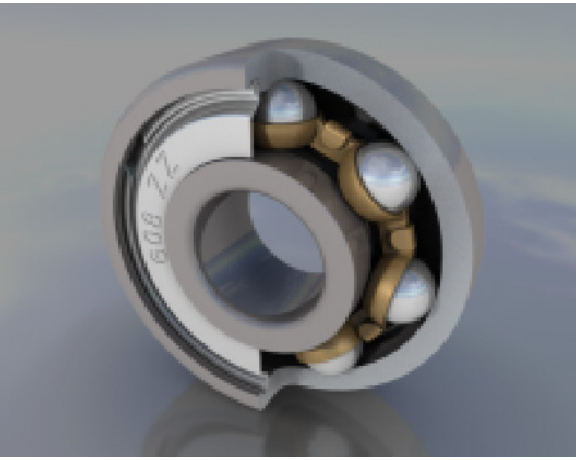
They are looking for Papers, Presentations, Courses and Workshops to be presented at the conference.

Proposal Checklist

Please submit the following information by email to ton@blender.org

Deadline: September 1, 2007

1. Personal information: First name & family name (and optional a nick), Address & country, E-mail address
2. Title of paper, presentation, workshop or course: Brief summary of your proposal (max. 200 words)
3. Outline of technical needs (in terms of set-up for courses, equipment and software needed for presentations, etc.)
4. Brief narrative biography (max. 200 words) - please do not send full CVs
5. Url(s) for visual and/or other supporting material



Producing Models with Accuracy

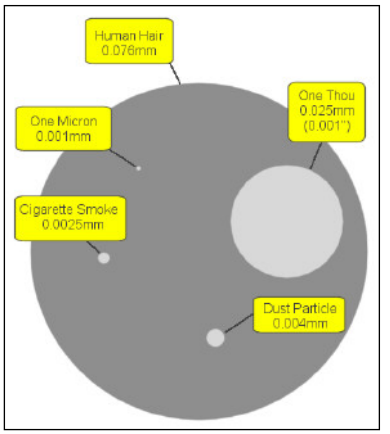
- by Robert Burke

Introduction

Many users of Blender see the program as a tremendous tool for creating stunning artwork or animations. Many modeling techniques are covered in tutorials for building models using methods such as box modeling, building shapes and forms polygon by polygon or tracing over a background image, used as a reference for the models shape and proportions. These are great methods to build an artistic representation of a product, but what happens when you want the model to be used for engineering and have the precision of a CAD model?

Fortunately, Blender's arsenal of internal modeling tools has been quietly growing and with a little forethought and planning Blender can produce models to a far higher dimensional accuracy than parts could ever be manufactured to. To start drawing with precision we need to consider the real world dimensions one Blender unit will represent. In architectural work it is common for one Blender unit to equal one meter, but this leaves the smallest dimension that can be viewed using the "Edge Length" feature as 1mm. In Engineering, parts are often produced with dimension tolerances of 0.02mm and sometimes as small as a few microns. To achieve this level of accuracy in Blender we would need to assign a dimension of one Blender unit to equal one millimeter, allowing you to view an edge length of one micron and model to sub micron accuracy (1micron = 0.001mm).

To help you visualize just how small one micron is, image 1 shows a size comparison related to a human hair.



To enable you to see large components at this scale you will need to increase the view cameras clipping distance *View››View Properties* and increase "Clip End" to a size larger than the model.

If you intend to model with CAD precision you need to adopt a work-flow similar to those used in industry standard CAD packages. *Constraint everything*.

Extruding with Accuracy

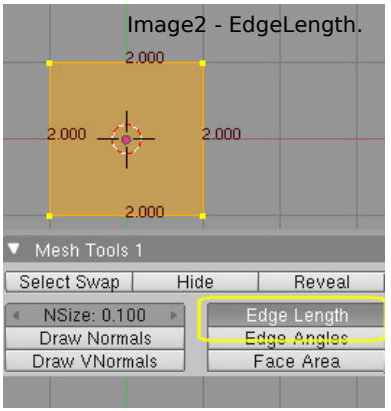
When Extruding, Rotating or scaling a set of vertices, Blender allows you to constrain their positions using numerical input. It's better to type in the length of an extruded edge rather than dragging the edge until the edge length looks right.

To constrain an extruded vertex to a set dimension, simply select the vertex you wish to extrude [RMB]. Press [E] for Extrude. [X or Y or Z] to constrain to a set axis. [12.513] or any other dimension for the length, (minus figures extrude in the opposite direction) then press Enter. The new vertex will be positioned the exact distance you entered along the axis.

If you need to extrude an edge at an angle to an axis simply extrude the vertex along the axis at the required length then rotate the edge to the desired angle. This is a little more complex because you need to use Blenders Snap tools. Say you wanted to extrude an edge 35mm long and 45 degrees above the X-axis. Select the vertex to extrude [RMB] snap the cursor to the vertex [Shift-S]

Cursor›Selection, the cursor will be used as the center point of the rotation. Extrude the vertex [E] constrain the extrusion to the X-axis [X] and a length of [35] press Enter, an edge has been created 35mm long on the X-axis. With the Extruded vertex still selected we need to rotate it -45 degrees from the cursor. Change the Pivot Point to 3D Cursor, so any rotation will be centered on the cursor position and press [R] for rotate then [-45] to rotate the vertex 45 degrees in an anticlockwise direction, press Enter to accept the rotation.

Constraining moves to an axis and dimensional input works for extrusion [E] rotation [R] move (grab) [G] and scale [S]. However with scale you will need to use a scale factor rather than a dimensional input. This is easily calculated by dividing the required finished size by the existing size of the object.

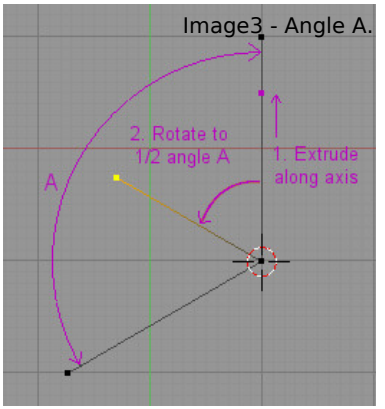


Using these simple procedures you can create the basic geometry of components to extrude or spin into accurate 3D models. But first the sections will need a little refinement. Very few components have sharp edges and it is normal for corners to be rounded off with fillets or chamfers.

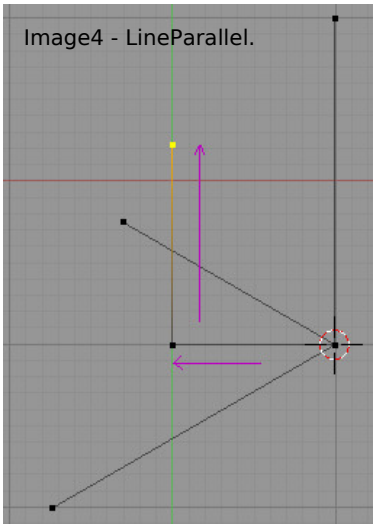
In CAD packages the Fillet and Chamfer tools automate the process of rounding off corners to a set radius or chamfer. In Blender you can achieve the same result but need to construct the geometry manually.

Adding Fillets and Chamfers

It's possible to accurately position fillets using Blenders mesh tools, but you will need to know the angle between the edges to fillet, the fillet radius you require and one of the edges must be aligned to a known axis. See Image 3.



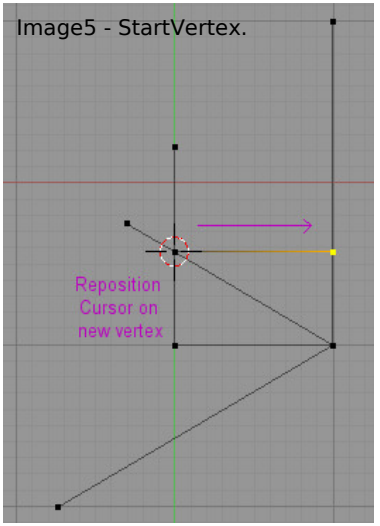
To create a fillet, extrude a vertex from the intersection of two edges 1.5 times



larger than the fillet radius. Rotate this vertex 1/2 angle A. See Image 4.
From the intersect, extrude a vertex perpendicular to the edge on the known axis and the length of the fillet radius.

Extrude another vertices from this parallel to the edge on the known axis. Where these two lines cross is the center point for the fillet.

Using the knife tool [K] snap a cut line [Ctrl-LMB] between the two reference vertices parallel to the known axis line and cut a new vertex on the center point of the fillet. See Image 5.

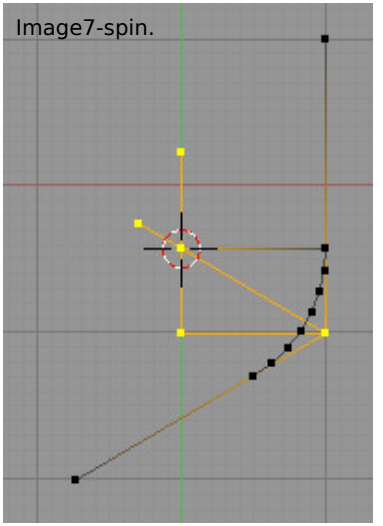


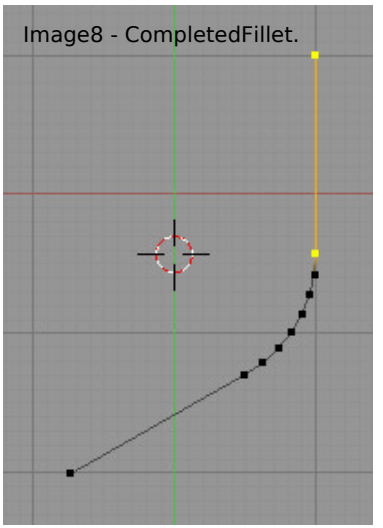
From the center point extrude a vertex perpendicular to the edge on the known axis at the length of the fillet radius.

Set the cursor on the center point and spin the vertex on the end of the radius edge through an angle of 180 degrees minus Angle A. See Image 7.

Delete the reference vertices. Re-make the edges between the fillet and surrounding vertices. See Image 8.

Its possible using basic geometry techniques and constrained dimensional input to accurately create almost any component. For the model to be useful in manufacturing it must be manifold (no internal faces) and contain no holes. Many rapid prototyping machines will accept a 3D model that has been exported as a .stl file and cutter paths for CNC machines can also be produced directly from the model.





To output a model as an engineering drawing layout that will print at an accurate scale I find it easiest is to set the camera in orthographic mode, with a camera scale set at a multiple of 25.4. Then set the size X and Size Y in the Format panel of the Render Buttons to an equivalent multiple but this time of 300 (printers tend to print at a resolution of 300 dpi).

So if you wanted to have a 1:1 scaled image fit onto an A4 page of 11" by 8" you would need to set the camera scale to 25.4 x 11 = 279.4, the Format panel Size X: to 8 x 300 = 2400 and Size Y: to 11 x 300 = 3300. There is one further requirement as the image is set to print at the screen resolution not 300dpi. This requires the use of an image-editing program such as the Gimp or Photo Shop, to change the output size of the image to 300dpi.

The above techniques are a brief extract of the information contained in the eleven-part tutorial Modeling a 608 Bearing. Which details the process and techniques needed to precisely model the bearing and produce an accurate scaled drawing. The 608 Bearing tutorial is the first part in my engineer's guide to Blender, more tutorials and techniques will be added as I work through the project of redesigning my CNC router.

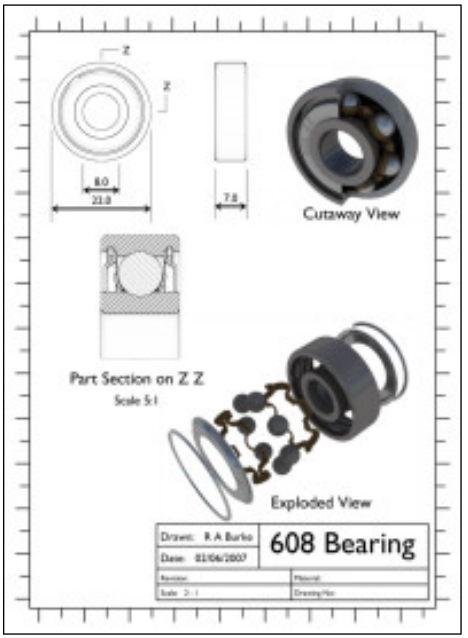


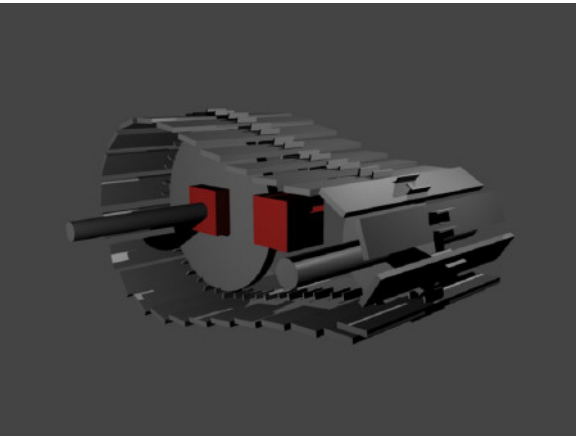
Image9 - layout.

Robert Burke
Staffordshire England

Technical Manager of a leading Building Products manufacturer.

I use Blender alongside 2D and 3D CAD packages to both quickly prototype new products and assemblies and produce graphics for both marketing and technical literature.

I have found blender an extremely productive tool and I am currently experimenting with techniques that will allow blender to be accepted as an alternative engineering design tool for hobby and model engineers. People who can't afford the excessive costs of 3D parametric modeling programs.



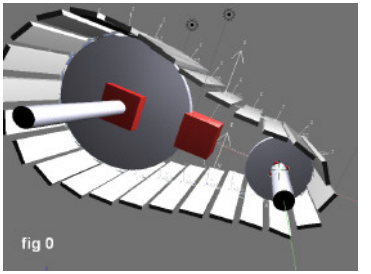
Amateur Mechanisms

- by Erick Ramirez

Introduction

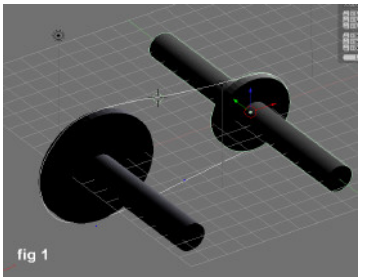
Mechanics is a very interesting theme in blender, as complex as it is. But it can also be used by amateurs, even animating a single cube can show an interesting animation performance. So I don't doubt at all that this tutorial -containing many experiments with the ipo window- will result in a good theme for people with interests in mechanical animations.

I accept that these animations will demonstrate little about scientific fundamentals for mechanics, but it is an opportunity to introduce further analysis of mechanics.



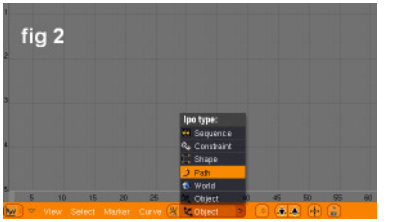
Constructing A Chain

I wanted to emulate a chain of some mechanical elements through some ipo curves and easy constraints.

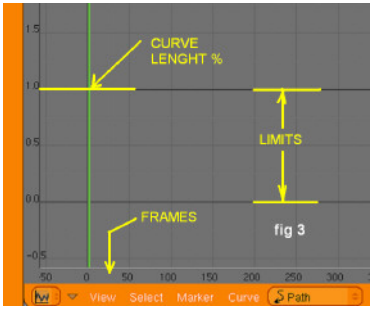


In front view create a pulley system with a large pulley and a smaller one, add other details if you want. Try to modify these features with Transform Properties Dialog box. Then, create a curve and adjust it to resemble the band for these pulleys.

Split whichever windows are convenient for you to see additional controls. And in the option 'Display Current Window Type' select Ipo Curve Editor.

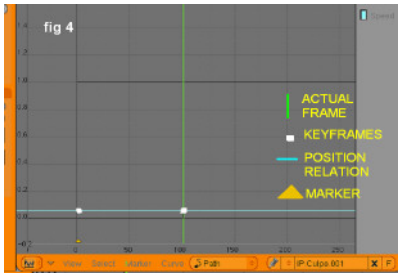


In the 3d Window, select the curve you created and name it C –this will speed up some settings afterwards-. As in figure 2, in the Option 'Show IPO Type', select Path -only available for curves-. You'll see a graph that Emo (a elephants dream movie character) no doubt would say "there's nothing there". Also, the parameter 'Speed' isn't enabled.



As figure 3 shows, the graph has some marked black lines that give some physical constraints of curve C. Inside this bounds you will create the position relation for objects which will use the C curve (in 3d window) as a path through the default 100 frames given to curves. All animations start with frame 1, by default when a curve is used as a path its

animation ends at frame 100. But if the animation was continued, a new cycle would start at frame 101. But this behaviour isn't shown in this graph because isn't activated.



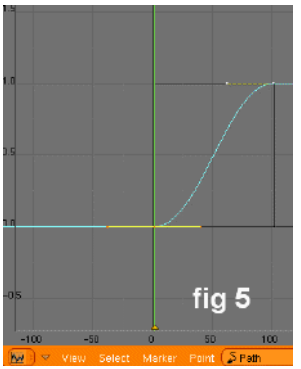
Create the new behaviour in Ipo curve editor by [CONTROL + left mouse button] inside of marked boundaries, it will create a horizontal line that runs through all visible frames.

Press N key or on Ipo header menu View››Channel properties of Transform properties, the transform properties box dialog will appear. Set the parameters as in figure 4.1.

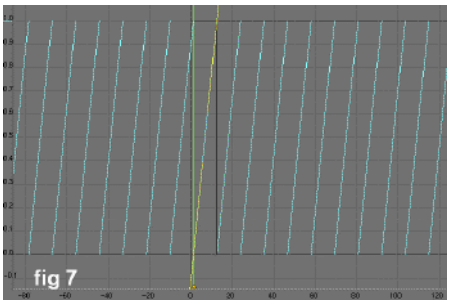
It looks to be a little difficult to understand behaviour through curves, but this is a cheap one.

Unfortunately, Blender doesn't show units. But if limits are 0 and 1, automatically you think about percentage. The Blue curve in figure 4 is the curve that we going to modify. Speed curves always indicate that velocity = position related to time or x(t). E. g. consider a horizontal straight curve with slope = 0; this 'curve' indicates just one position (%) all the time, thus, path just has a single point available to objects that uses this curve as path. But if this straight curve has slope, objects will run through all positions of path with a constant velocity, if slope is small, objects will run very slowly, but if slope is big, objects will run very rapidly. But if the straight line is totally vertical, objects would occupy all positions at same time (infinite velocity). If slope become negative the direction changes.

Due to the fact that curve C is a closed path, a cycle for constant velocity is a straight sloped line, if we want add a variable velocity we must get a curve, but in this case we just need constant velocity.



To create the next key, move the green bar to frame 101 (it can be achieved with right arrow button) and press I key to INSERT A KEY VERTICE to current frame. Next enter edit mode by pressing the TAB key and with the vertex at frame 101 selected press G key to grab up it to 1.0. You can also achieve this by typing 1 in 'Vertex Y:' field in Transform Properties Ipo dialog in edit mode. In the 3d window, create a empty object, then, SHIFT + select curve C and [CONTROL+P key] and PARENT TYPE dialog will appear, then select follow Path. Select only the empty object and [ALT+O key] to clear origin, next press [ALT+A key]. The animation starts and the velocity for the empty object is variable (it is slower at the start and at the end, and slightly faster in between).



Go to the Ipo window and on the header menu select [Point››Extent Mode››Cyclic]. This will extend velocity beyond the frames we started on. With the vertex at 101 frame still selected, press G key and grab horizontal through left and right, cyclic will change as you move this vertex, experiment with this behaviour

and check it in 3d window, undo the changes you made to go back or select a position for this by typing values in Transform Properties dialog.

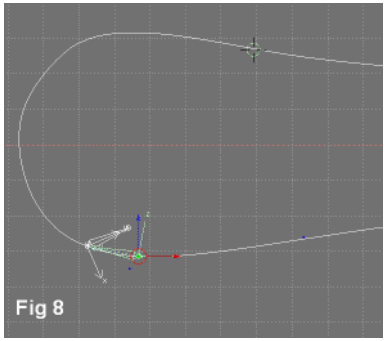
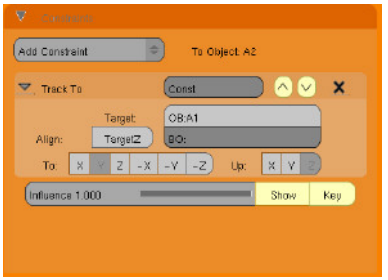


Fig 8

Delete the empty object, and in Front View add an armature object named A1, press F7 to display the Object panel. Select Draw Name and Axis in the Draw extra settings (Draw panel), in the Anim Settings set track to Y, Up to Z. Parent with curve C to follow path and clear origin again as you did with the empty object.



With A1 still selected press [ALT+D key] to duplicate, name the new armature object A2. On the Constraints panel, add 'Track to' constraint, type A1 in OB: Target Object field -A2 will track A1-. In the Anim Settings panel type 1 in the TimeOffset field, move the frames in the 3d window with the Right arrow key and back to see the new offset with armature objects, adjust the TimeOffset values to get a good looking chain.

Next you will create a linked duplicate of A2 and name it A3. Change the name on the OB name field (Constraints panel) with A2. Change the TimeOffset value for the number given to A2 and Right arrow to add *2, the result will be the TimeOffset value for A3. [ALT+D key] to create a linked duplicate of A3. Change the OB name field (Object and Link panel) for the next number, Change the target name on OB name field (Constraints panel) for the precedent name, make sure this name target exists. Position the cursor inside the Time Offset field and CONTROL+ left mouse click to avoid moving this value and add + .(A2 TimeOffset value).

Do the same for the next duplicates until you have filled the curve. Finally add a empty object called 1 and add a 'Copy Location' constraint with last armature object. First select the armature object (A1) and add a 'Track to' constraint to this Empty object by typing 1 in the target panel.

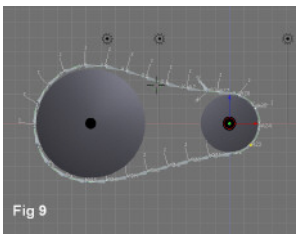


Fig 9

The result will be a chaining mechanism that will have an excellent performance.

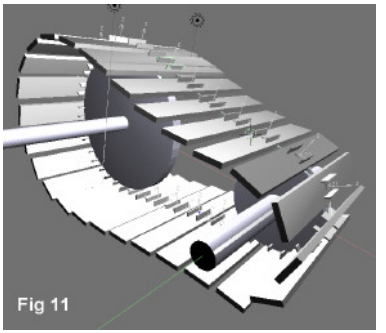


Fig 11

Add some objects and add to each of these 'copy location' and 'copy rotation' constraints to occupy the location of armature objects.

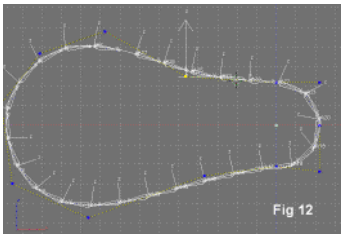


Fig 12

Select curve C and add some Hooks by selecting a vertex or a group of vertices. In Edit mode for curve C select the vertex group for the larger pulley and [CONTROL+H key], select 'Add, to New Empty'; and add a Hook. Select the vertex group for the smaller pulley and add a Hook. Add others Hooks for the vertices that are left. Parent curve C with a large cube object. Create 2 more cube objects for pulleys and Parent to the large cube.

Parent the empty object that is the Hook for large pulley and parent it to the closest cube, The empty object for the smaller pulley will parent with closest cube of vertices. Other empties belonging to this curve will parent with the large cube.

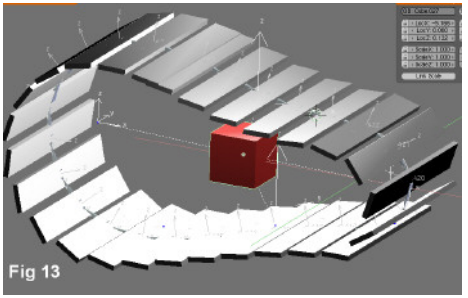


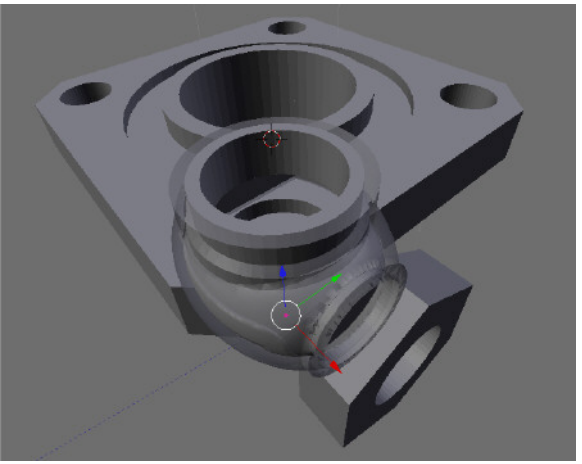
Fig 13

Conclusion

So the large cube will move all the mechanisms, you can tweak, rotate, and move the parent cubes and single hooks to get a nice effect in animation and so on. The file related to this tutorial has a little animation. The Camera also adds more effects.

Erick Ramirez

Erick Ramirez is an Industrial Engineer specialized in 3d projects. During several years he has modelled industrial models in diverse industries and handled tutorials in National University of Mexico. Currently he is in a search for promoting blender as a common knowledge among society.



Solid Device Construction

- by Erick Ramirez

Introduction

For some time, virtual reality has helped scientists to simulate all scenarios where geometry is involved. This leads to improvements in each aspect of the process planning in industries, government, schools and life standards. Personally I consider graphics are as natural as the language because we live in 3d space and sometimes we get confused when talking about physical objects with words. The language is extremely flexible and we can describe all aspects with the right combinations of words.

This tutorial is a part of a project that carries some deductive methods and constraints on a effort to achieve solid models in blender 2.44. 'Solid modeling' is a term not even used in computers graphics. In fact, solid modeling has recently emerged to resolve some problems related to mechanical modeling with excellent results. As the abilities of blender have been enhanced through all blender versions and builds, always getting closer to solid modeling. To test these new abilities, I started doing this tutorial that consists of modelling a solenoid valve. This valve can help you learn how this device operates to control the steam input-output from a pipe system.

Constructing Geometry

For solid modelling there are conditional rules that help to control several variables while this device is constructed. These rules are the creation of reference objects like planes and shapes. Planes serve to easily detect a reference position in 3d view and shapes give a reference geometry for creation of new future objects. Figure 2 shows the use of Cartesian planes that support the main origin. In top view an outline was created with a circle of 4 vertices, this object was called 'PlanexyBase', and then it was duplicated and rotated to get the other 2 Cartesian planes.

Blender has the ability to manipulate parameters directly from the Transform Properties dialog in object mode and edit mode (each mode has it's own parameters that you can adjust). Solid modelling requires the continuous use of this Transform dialog to control construction process. In solid modelling there's no way to start with low resolution models so it is good idea to clone each object you finish, in case these objects become useless with the consequential operations while the model is getting more complex.

The Solenoid body was made of a medium resolution uv sphere in top view with 48 segments, 48 rings and a radius of 30. Without leaving edit mode, and with all vertices still selected, in Front view the sphere was rotated 90 degrees. However, in object mode the parameters can change thanks to transform properties dialog box [N key]. The parameters of the new sphere need to be changed with y and z = 48.00 and x = 60.00 to get an ellipsoid shape. Inside of this there will be 2 chambers. Several bosses will be created to model valve connections.

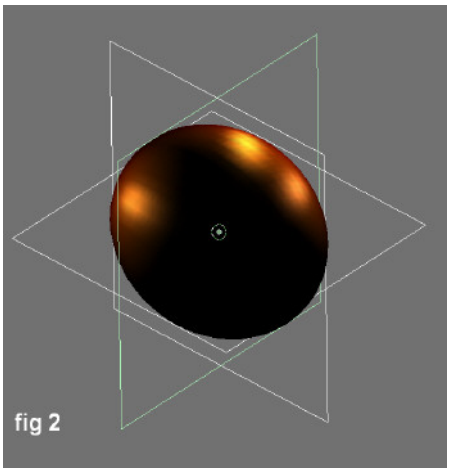


fig 2

After, a second body was created in top view, watching out that the cursor wasn't moved off, as a way to maintain the xy base plane domain. The parameters for this cylinder are 48 vertices, dimensions for x and y = 42.00 diameter, z = 24.00 (object mode). By default, Blender gives the cylinder its median point (pivot) centered. To change this, you are going to take the centred vertex at the bottom of the cylinder and snap the cursor on the selected vertex. Within object mode use SPACE BAR››transform››center cursor to change median point position. Using snap gives excellent results when an exact object position is required. But changing the cursor position isn't enough, the cylinder had to move to planexyBase position. The main goal of Cartesian plane is provide history of each object's relative position.

As figure 3 shows, the cylinder is subdivided through its height to give a more controlled tessellation when operators are added to object.

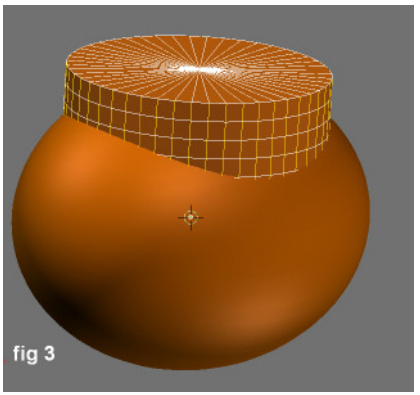


fig 3

Next with Cartesian planes on a different layer, the plane yz was duplicated and located at x position = 26.00, y and z = 0. You can see this by selecting this plane and viewing transform dialog box where it says 'LocX:26.000'. Then, with this plane still selected, SHIFT››S key to move the cursor to the median point of the plane. This will be the position for the next object: shape geometry and object geometry.

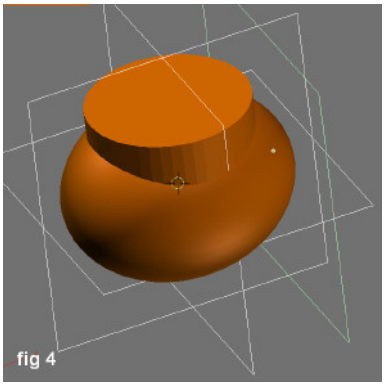


fig 4

Shape Geometry

The shape geometry was made on another layer, especially made for storing all reference geometry for the solenoid valve. At this point the shape geometry was achieved in Right view adding 4 single Circles of 48 vertices each and all circle diameter parameters are: Smaller circle = 18.500, the next = 21.900, the next = 28.600 and last = 38.500. Last circle will be the reference bounds for a hexagon form.

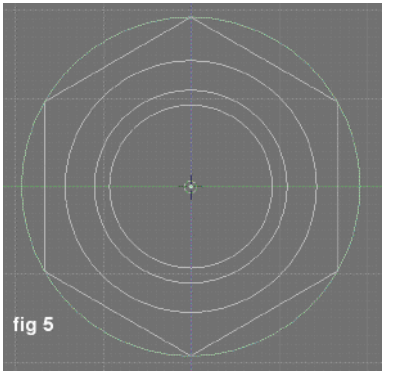


fig 5

The second large circle will be the reference for the third object for the solenoid. This third object will be duplicated on the plane yz position, a cylinder with 48 vertices and parameters in object mode of X and Y = 28.60, Z = 20.00 inward. Then a symmetrical cylinder will take place for mirroring. Mirroring in solid modelling must be done with care to ensure that normals are all pointing outside of the mesh or there will be unexpected results.

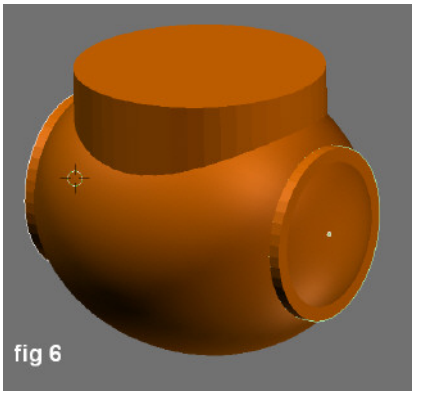


fig 6

Finally another cylinder was added to the solenoid valve, first by duplicating planexy and locating it on Z = -28.50, X and Y = 0. Within the duplicated planexy position a cylinder was added of 48 vertices, X and Y = 30.00, Z = 12.633 towards the inside of solenoid. All positions were checked by reviewing all plane positions.

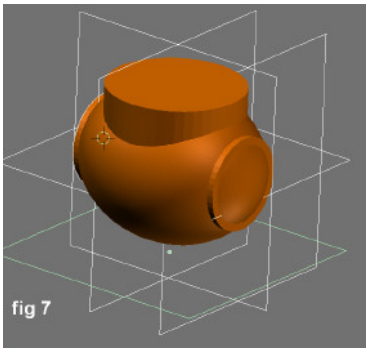


fig 7

Once the positions were checked, the last cylinder was subdivided through its height to start Booleans operators. All objects were duplicated and stored in another layer (In case they were needed again later). Start by applying union Boolean with the third and fourth objects to the main body. The result is a smoothed object thanks to 48 vertices constant on each object. The duplicated objects should once again be stored on another layer. Finally the last object was added to achieve the desired object.

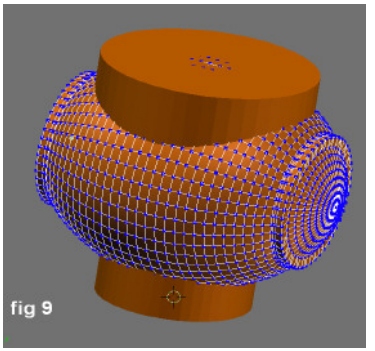


fig 9

Figure 10 shows that there were mesh face losses because the last object didn't have all normals outside or perhaps there were redundant vertices, and the result was unexpected as I said before.

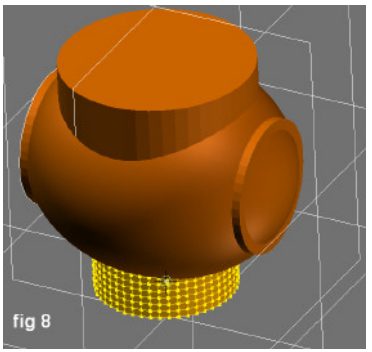


fig 8

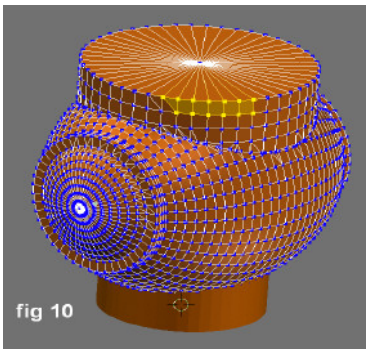


fig 10

So when you want to use Booleans operations you must check the normal direction with the option 'Draw Normals' in Mesh Tools 1 panel (edit mode). Also, the option 'remove doubles' is useful by making tests of vertex merge levels incrementing the value of 'specifies the max distance 'Rem doubles' will consider vertices as 'doubled'' with care to avoid resolution loss-less. There are cases where the unexpected result can affect next objects. As in this case, there were some.

The result should be a single mesh with a few redundant vertice errors. This mesh was opened by deleting the top most centred vertex in order to prepare to add a thin wall inside this mesh with the new scripts added to Blender 2.44. Select all vertices, then select mesh››scripts››solidify selection.

New Objects

To the solenoid mesh a -3.00 of thickness was applied to create a shell, this will be the space for solenoid chambers.

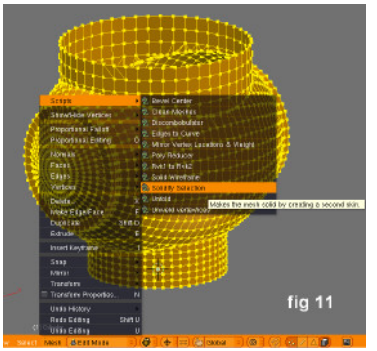


fig 11

This script works wonderfully to create even offset meshes, with no normal directional problems. The bevel center script creates bevels to selected areas, this is good for some solid areas.

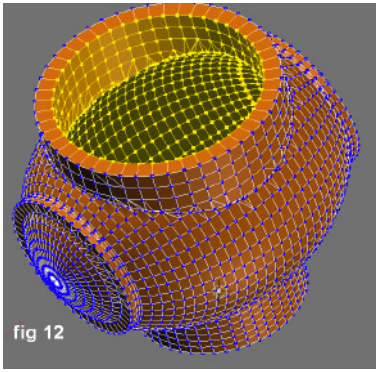


fig 12

Next it is required to create holes in the sides of the solenoid. The opening shown in figure 12 is for an automatically controlled device that opens and closes the path of the steam. Above this valve there is an electromagnet that controls that opening.

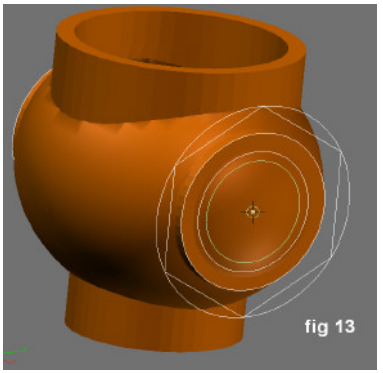


fig 13

For creating the holes, use the second to smallest circle. This circle will be the reference for a cylinder that passes through the solenoid body. Once you have created this cylinder, the procedure for subtract or apply difference Boolean is first to select the cylinder (first making sure all meshes don't have any normals facing inside), repeat the magic words 'subtract this (cylinder) from this (solenoid)' and voilà, the hole has been created. (Okay, not really, just apply the Boolean operation like normal).

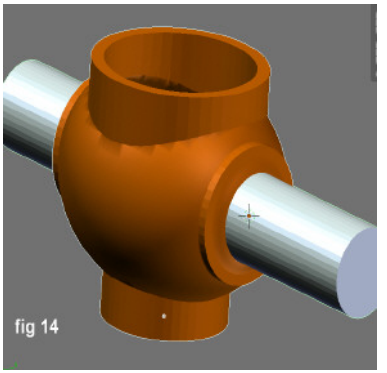


fig 14

The result gives you an idea of what I am doing. Truly, the possibility of making solids, is in many cases hard in blender because the calculations (if they are at a high resolution) take a while. But instead, blender has tools that can create excellent walk-throughs and animations. There are numerous options for importing different formats to blender, this means a potential library that Blender shares with other programs, adding value to Blender and its users.

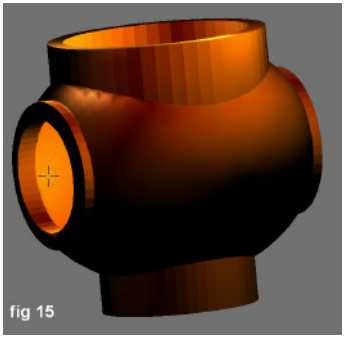


fig 15

Figure 15 shows a shaded model (I recurred to Blender material library). Next with the cursor on the hexagon shape and in Right view a cylinder of 6 vertices and diameter of = 38.50, Z = 12 was created . To this cylinder (although it doesn't seem to be a cylinder) it is necessary to subtract another cylinder (reference is the smallest circle).

At this point it wasn't necessary to unite this last object with solenoid body. You can join them with CONTROL+J key due to the fact the the last object is the outer most external solenoid object.

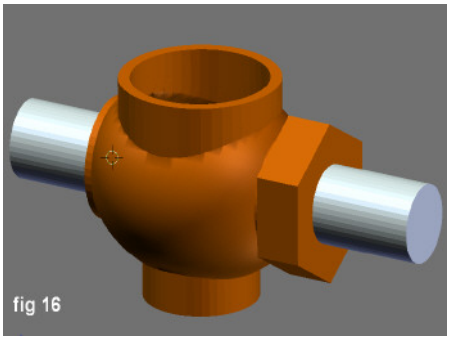


fig 16

Next a mirrored object and a cross section for creating a wall that divides the cavity into two chambers. But first, the cross section must be created. With the aid of planes and circles (with parameters) the cross section was created. The reference geometry was used with snap operations, and then the cross section was 'skinned' arbitrarily.

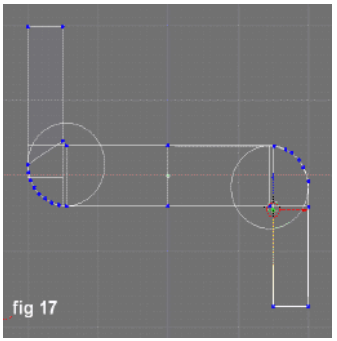


fig 17

In some cases when planes and circles fit well and form a single mesh, the option remove doubles can help to merge unnecessary vertices. Solid modelling can strongly use the option remove doubles to weld separated meshes in edit mode.

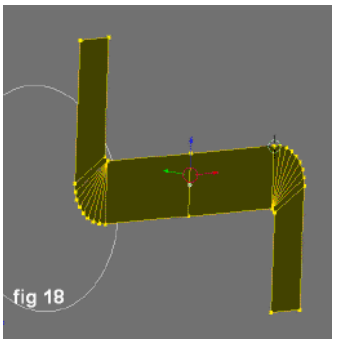


fig 18

With this cross section made, the next step is to create the wall by extruding this region (fig 18). This wall will have an opening in which another object will fit into this space to control the opening lowering and lifting itself, controlling the steam flow.

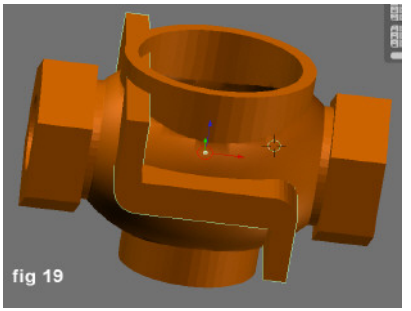


fig 19

The next step is to fit the wall within the solenoid cavity. For this, the intersect operator will work. To crop this wall it was necessary to offset the first object (main body) that was in an another layer. The offset was created with a distance of 1.5 and exterior vertices were deleted , inner vertices were left and their normals were recalculated outside. Then the ellipsoid was selected and then the chamber walls

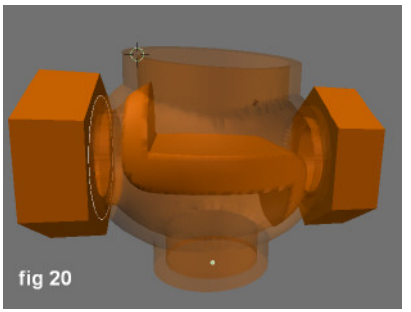


fig 20

were selected and was pronounced "create the resultant intersection of this (ellipsoid) and this (wall)"…next step!!!. Figure 20 shows the function of chamber wall.

A cross section was created above the opening with the objective of adding more material to thicken the mouth of the valve with a donut form that is shown with x ray property. [Draw panel››Draw extra››X-ray]. Figure 21 shows this section above left.

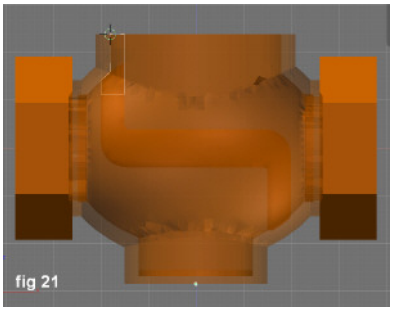


fig 21

This donut was created with the Spin command inside of Mesh Tools panel (edit mode) with step set to 48.

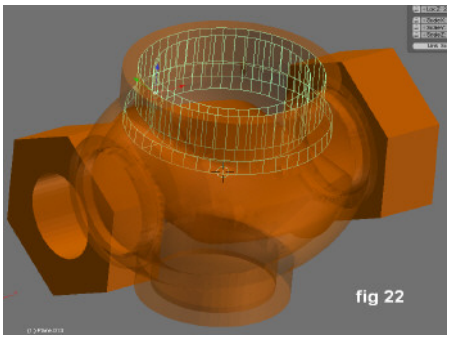


fig 22

Transform Properties In Edit Mode

Figure 23 shows it is possible to change parameters by moving some vertices in edit mode, but first you must do CONTROL+A Key to apply rotation and scale. Then, you can access the transform properties dialog in edit mode.

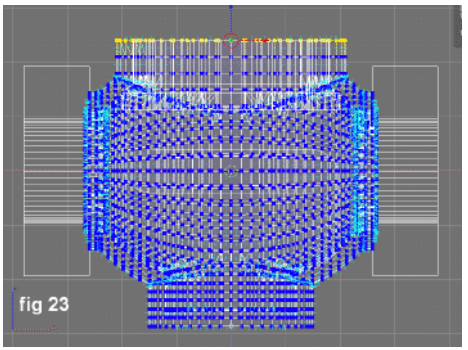


fig 23

To add more dimensions to the solenoid it was necessary to create a donut above the solenoid mouth and another plane was added at xy at Z = 31.498, X and Y = 0,

This position reference now helps to add another box with parameters of X and Y = 64.2, Z = 11.00 upwards. As well as a cylinder with parameters of X, Y, Z = 30.00 to subtract material from last cube object.

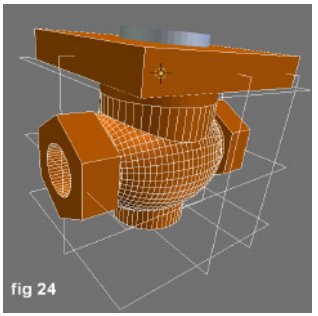


fig 24

Next steps were needed to add more objects to the chamber wall, another plane was created at xy at height of 'Loc Z: 4.00'

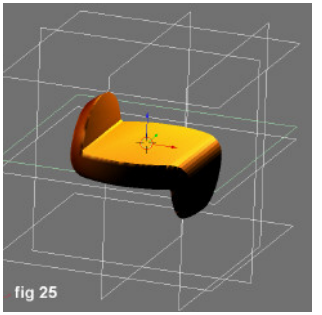


fig 25

Hole parameters were a tube with inner diameter of 18.00 and outer diameter of 28.00 and Z = 5.00.

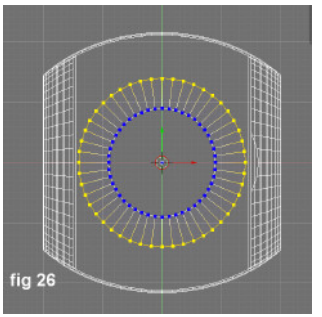


fig 26

At first there were problems while trying to subtract material because the wall was extruded using too few vertices, but at last, with a little revision of recalculating normals outside, the subtraction was achieved.

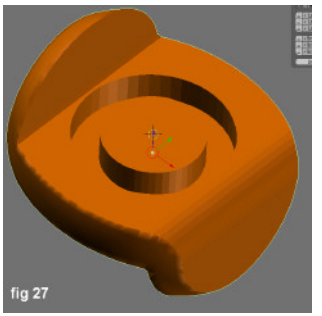


fig 27

Another subtraction of a cylinder with diameter of 12.2 was achieved.

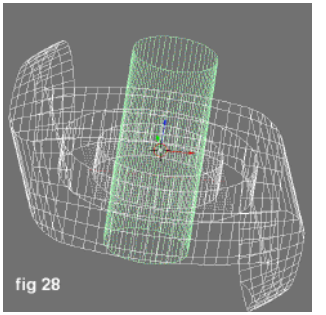


fig 28

The resulting is a space for a device that will fit in to close the opening made by a later cylinder.

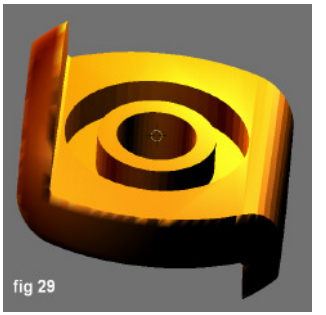
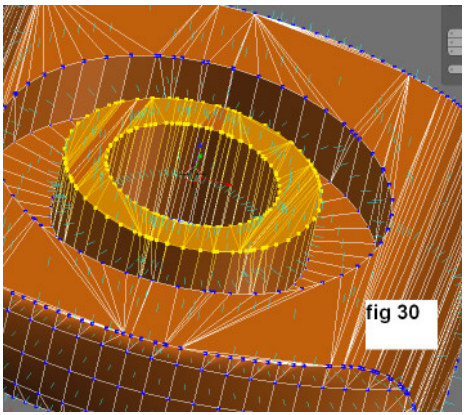
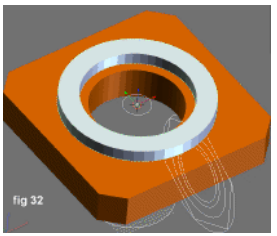


fig 29

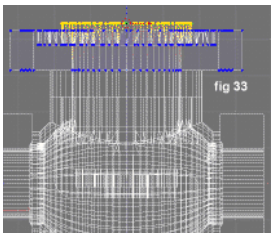
For more adjustments, you need to move some vertices in edit mode with the transform properties dialog. In some cases, units for transform properties were incorrect when it didn't have 'apply rotation and scale' applied . Vertices were moved down changing the values where it says 'median Z:value'. In this edit mode transform properties dialog it is possible to add operations like sum, subtract, multiply, division. E. g. If you want move down a group of vertices 5 units, you must leave the actual value in the field and write in the -5 value.



Later, another tube subtracted material from the last object to create sittings where other objects will fit.



Again the vertices were pulled up to correct these sittings.



A pattern of reference geometry for bolt holes was created used the function of 'Rotation/Scaling Pivot' set PIVOT to '3D cursor'. Figure 34 shows original circle (above left) cloned and positioning clones by rotating each 90 degrees with cursor inside of other reference circles.

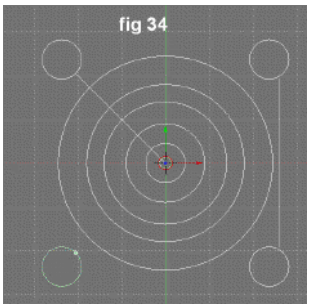
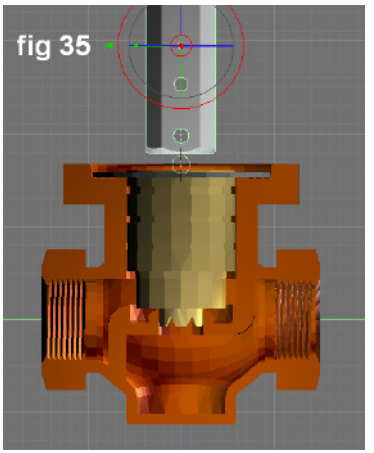
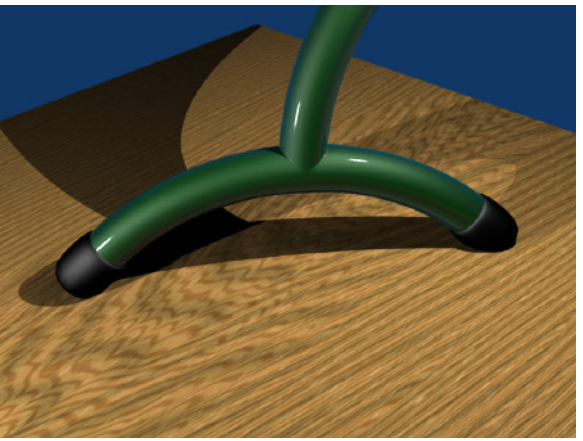


Figure 35 shows the mechanism used in conjunction with the solenoid valve and chambers divided by a wall. In reality, several sensors detect the steam flow and temperature at any given time, giving instructions to an electronic device to give certain voltage to an electromagnet that opens gradually or semi closes the valve to let different quantities of steam pass. The blend file related to this tutorial has a little animation with a camera and a second scene where a solenoid valve was made in another application.



Conclusion

Solid modeling is becoming possible in blender but the development needs perhaps to consider the option to create solid objects (not meshes) to achieve mechanical models. This represents new opportunities because management for solid objects is little different than meshes.



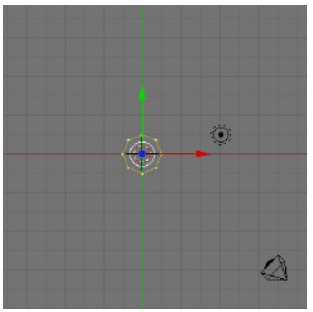
How to Create a Weld Joint

- *by* Andrew Lane

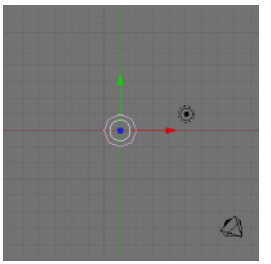
Introduction

This effect could probably be achieved using booleans, but the method explained here is a good practice.

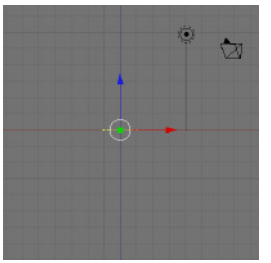
We will start of by creating a circle. Using the space bar tool menu: mesh-circle. Create it with eight vertices (just for speed of editing later on). We now have a circle centered on the cursor [fig 1].



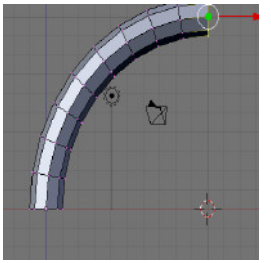
Now click the 3d window to the right of the circle to separate the cursor from the circle [fig 2].



Make sure [Numlock] is on for this tutorial, then press [numpad 1] to get this [fig 3].

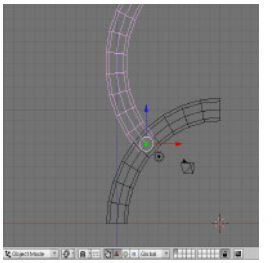


Our view point has changed to the side view. Go to the editing window [F9] and in the Mesh Tools section press SPIN. We have made a curve based on the shape of the circle [fig 4].

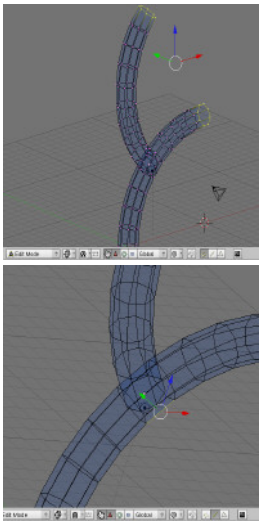


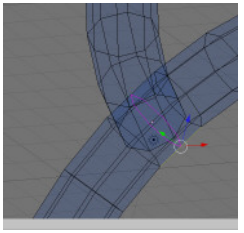
By changing the Degr spinner value (below the SPIN button) to a negative we get a curve in the opposite direction. Press [tab] to exit edit mode. This is the shape we will work with. Duplicate it once: While in object mode [tab], press [ctrl d] right click to confirm the copy. Rotate the new copy through 45 degrees in the y axis and reposition it [fig 4]. One shape penetrates the other about half way. This an artistic tutorial not a super scientific technical one, so don't worry about precision. Save your file regularly if you wish. I have pressed [z] to reach wireframe mode for these screenshots, if you are new to blender.

Select one of the tube shapes, hold [shift] then select the other by right clicking it. Pressing [ctrl j] will join the shapes into one editable mesh. Pressing [tab] will reveal the new mesh [fig 5].

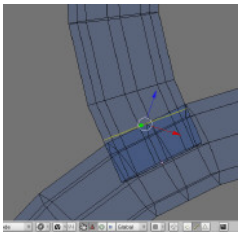


Enter edge select mode [ctrl tab 2] and make some cuts in the mesh just to refine it. Right click this edge [fig 6] then press [crtl r]. Now, left click twice to make the cut [fig 7].

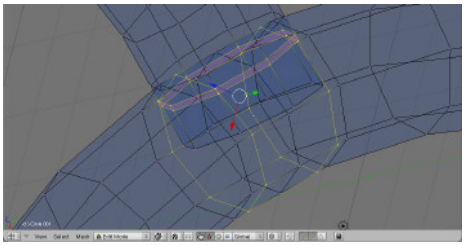




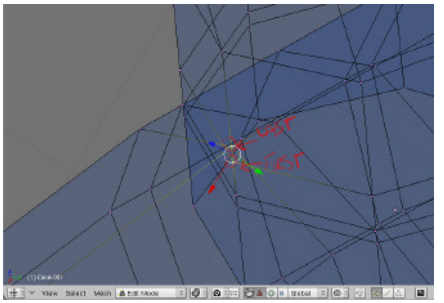
[fig 8] shows me making another cut where the two objects meet. We need to create two vertices at each point where the surfaces meet, so your cuts may need to be in slightly different positions from mine. You need to make about 4-6 more cuts in the mesh to get enough vertices to merge/weld together [fig 9].



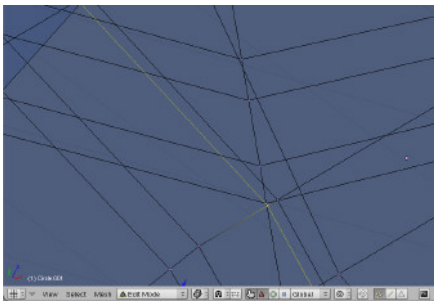
Now we need to weld. Enter vertex mode [ctrl tab 1]. Select two vertices that are close to each other, one from each tube shape. Select from the vertical tube first, then the horizontal tube [fig 10].



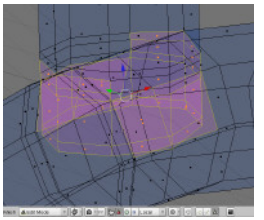
Press [w] then select MERGE from the list. Repeat this process at the boundary of the tube shapes where the vertices meet up. Select vertices in the same first to last order so the surfaces don't warp. If pairs of vertices don't match up, perform more cuts [fig 11].



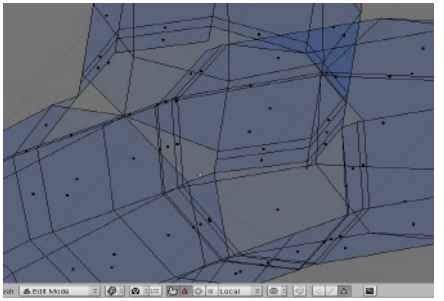
Go into face select mode [ctrl tab 3], and select the faces of the mesh that are covered or part covered by other faces [fig 12].



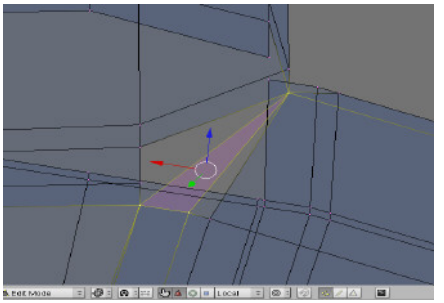
Pressing [x] will bring up the erase menu, select faces. This should make quite a mess of the mesh (try saying that after a few pints) [fig 13].



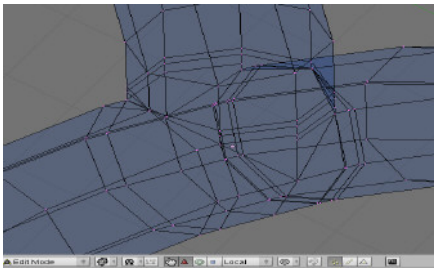
Once again, go back to vertex mode and begin to repair your mesh by selecting 3-4 connected vertices and hitting [f] to create a face [fig 14].



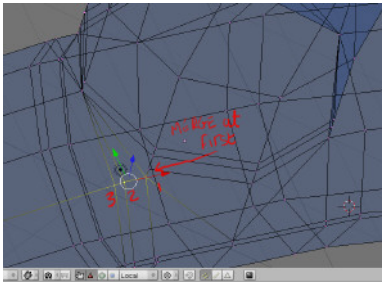
Repeat until all is well again [fig 15].



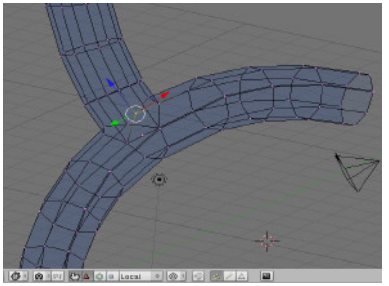
Now I will merge these 3 vertices [fig 16],



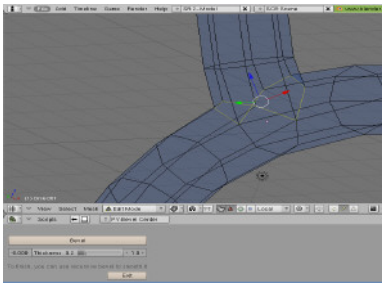
deleting vertices created during the cutting stage until we have [fig 17].



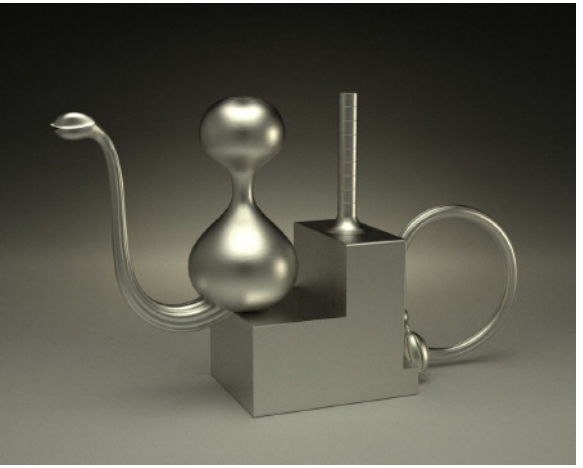
Select these edges [fig 18],



then enter the script menu. Select Scripts-›Mesh-›Bevel center. Press the large Bevel button to create a weld seam of the selected edges [fig 19], which could be uv mapped later.



I hope those who have never used the 3d cursor for modeling before will be exited by its potential for creating arcs and curves as the basis for more complex shapes. I will write another article along these lines in the future, thanks for reading.



Use of Blender as NURBS/CAD Application

- by Claas Eicke Kuhnen

Preface

I created Blender files for this article. Please feel free to look into it while reading.

Introduction

Class-A NURBS and ACIS solids are the preferred tools of choice in Industrial Design and Product Engineering. Those tools provide the designer with the engineering requirement and artistic freedom.

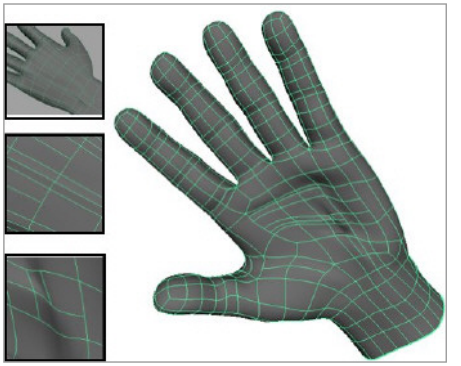
In addition to those tools most high end applications also provide a true construction tree. This is similar to the history in Adobe Photoshop . However the difference is that it enables you to change properties of your design without having to remodel all following steps. An edge fillet for example for solids is called a feature. It changes are interactive and not permanent.

The nice aspect of NURBS and Solids is that in most packages like Ashlar Cobalt you can convert a closed NURBS object into a Solid and apply functions like boolean operations or complex edge fillets. Afterwards the Solid can be split into individual NURBS patches which reflect the applied Solid tools.

Blender in contrast does not provide any of those techniques. However if you pay attention to the current software market for industrial design products you will notice that more and more companies include complex polygon mesh tools into their packages which go beyond the rudimentary import function.

With Rhino 4 McNeel increased significantly the polygon mesh tools. But they mainly are still limited to clean up work, not for surface creation. Everybody who works withNURBS and construction tree values the flexibility and precision it provides. However NURBS also has its limits. For many years, Autodesk Maya has had the ablity to convert 4 sided polygon meshes into subdivision surfaces which than can be converted into NURBS patches.

And recently T-Splines also brought their T-Spline technology as a plug-in into Rhino. T-Splines in contrast to Mayas's subdivision offers the possibility to to work with subdivision surfaces like in Blender, but additionally has the ability to locally add additional edges onto a face. This can result in faces with more than 4 edge points.



This is very familiar to traditional NURBS patch modeling of a face. In NURBS, edge curves can occupy the same space while having a different amount of control points. However the contrast is that with NURBS you handle stitched patches, with T-Splines you work on one mesh object only.

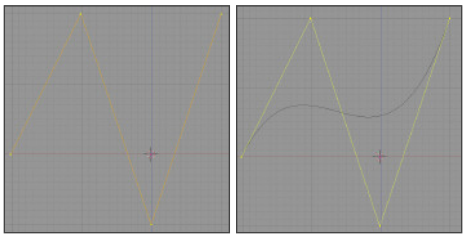
T-Splines inside Rhino 4 can then convert the subdivision model into very optimised NURBS patches to enable the designer to apply NURBS specific tools to the model like fillets, blends, or trim surfaces for example.

However as great this sounds, the work-flow with T-Splines polygonal mesh modeling in Rhino is limited. Rhino is a NURBS modeler and T-Splines brings some basic mesh modeling into Rhino. This is where Blender with it's quite powerful mesh modeling tool set comes in.

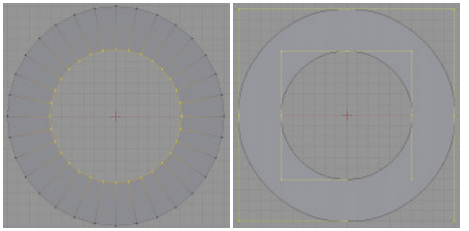
I Subdivision Modeling to NURBS Work-flow:

This illustrates the new possibility for a designer to not only rely on NURBS and Solids but also to utilize polygon mesh modeling with the usage of Catmull-Clark subdivision surface smoothing to create surfaces - which are rather difficult with NURBS or Solids.

Polygon mesh modeling never played an important role in Product Design. A main reason for that is that a polygon model provides internally only linear edges while NURBS surfaces are always smooth.



The same still applies to when you increase the density of the mesh.



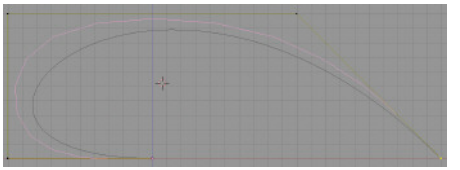
A common trick to make a mesh model look smooth is to turn on vertex normal smoothing which simulates a blending between faces. However this is just a simulation - looking straight onto an edge reveals the true linear geometry structure.

In a nutshell you can explain NURBS as computed surfaces which are based on math calculated curves. Surface structures can thus be calculated by curve projections. Mesh modeling is comparable to working with linear wire sticks. Surfaces structures are modeled by hand.

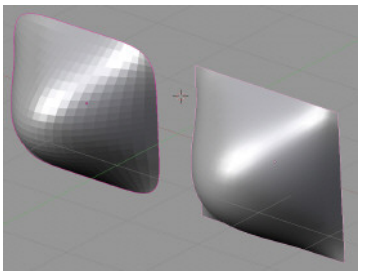
However what seems at first a disadvantage, and that is how polygon mesh modeling was treated in the past, can be very useful for even CAD applications.

The magic word is 4 side polygon modeling with subdivision surfaces.

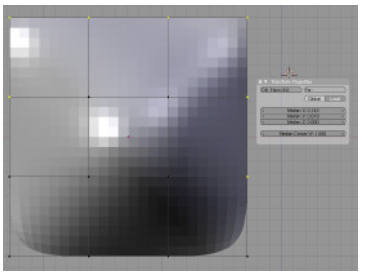
Blenders subdivided surfaces behave very much like NURBS surfaces. Lets compare a 4 point NURBS curve with a Catmull-Clark curve. The similarity is that the two curves flow through the start and end point without touching the points in between. The difference is of course thatNURBS is smooth and you can see the linear sub-segments of the subdivision surface curve.



The same nearly applies to surfaces. The difference you can see is that the NURBS curve is spawned perfectly inside the 4 sided control patch while the subdivided surface does not flow from edge to edge

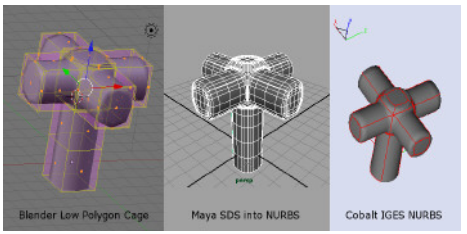


- instead the edges are round.
However this can be changed by applying a full crease weight to the patch edges



The important aspect behind this comparison is that instead of modeling straight in Rhino for example, the designer could sketch out the basic model in Blender, import it into Rhino to finish it up there. Subdivided surfaces allows you to extrude faces whileNURBS can cut holes, trim parts away, and create blends which match perfectly the tangency of the two connecting edges of two objects. With the possibility to turn a polygon mesh into matching NURBS patches utilizing a subdivided surface algorithm, the best of both worlds are combined.

As a quick example, please take a look at the following image. It shows a very rough model of a water faucet. Modeled in Blender using a low polygon cage exported that is then imported into Maya and converted intoSDS and then into NURBS. From Maya exported as IGES into Cobalt. As you can see there is no loss in detail. Modeling this object in Blender including converting it through Maya was faster than building the object in Rhino straight with NURBS. Pay attention to how the surface between the horizontal 4 extrusions flow into each other and vertically along the main shaft of the faucet. A simple looking but quite labor intensive work.



Case Study 1: Surface Shell and Chamfer creation

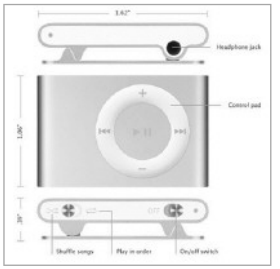
In my last CAD class I introduced my students first to Blender as a modeling application utilizing subdivision modeling as a basic introduction into how to think in 3D and how to create surfaces. The first major project was to design the new I-Pod Shuffle. This product offers many aspects to learn:

Part 1

Extrusion of profiles, creating fillets and chamfers, and creating planar surface fillings between different profiles. In addition, it made heavy use of Blender's snap and scale along axis constraints in conjunction with the 3D cursor. Working in proportions and using Blenders measurements.

1. Pre-Planing:

Measurements, the big concern in Blender for new users can be approached in a very simple way. Through utilizing a technical drawing of a newiPod Shuffle the students were quickly able to work in correct proportions.



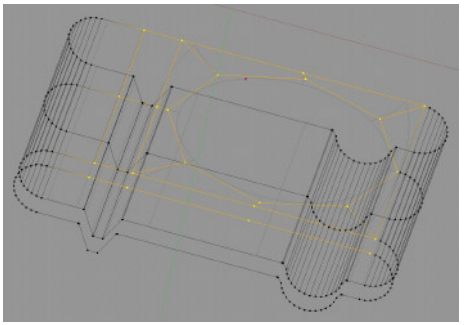
However, the supplied dimensions can be used as well. All that was required was to scale a box to 1.62 to 1.06 to .19 to create the rough dimensions which represent the iPod. While Blender does not supply you with any unit system, you can still use the Blender units and decide on your own what they represent. In this case 1.62 in Blender were equal to 1.62".

We need to do this to the 3D object and afterwards also to the mesh inside. This way the 3D body has the same measurement values as the 3D mesh. Additional measuring of parts by hand helped to more carefully model all needed parts. Afterwards we scaled down the image to fit the box dimensions.

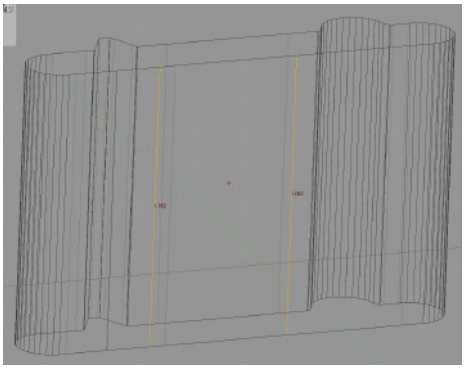
2. Shelling Sides:

We started with drawing out the top profile of the main body using the straight lines and for the sides half circle with 32 vertices. From the beginning we applied the subdivided surface modifier to create smooth curves. In the profile we also already built in the edge blends to form smooth transitions at the corners.

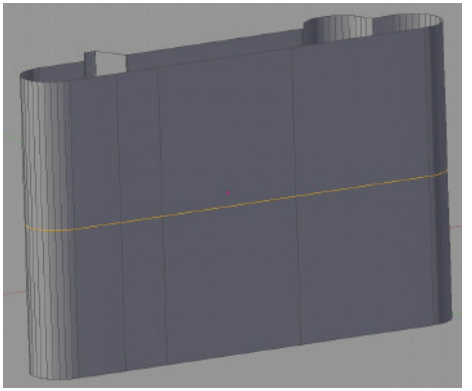
We also subdivided the one edge which is above the radial button to build in the geometry we need to build in the round hole for the radial button later. This required some properpre-planing before modeling.



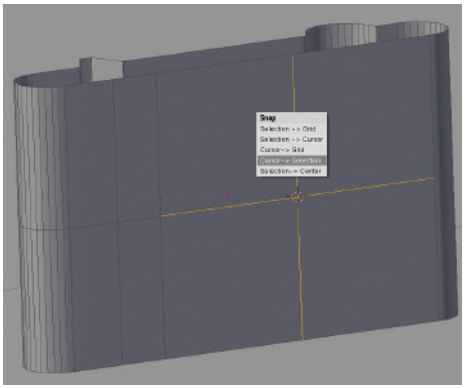
After that we can extrude the profile to the desired length. By turning on the edge length, we can make sure to perfectly hit the right values.

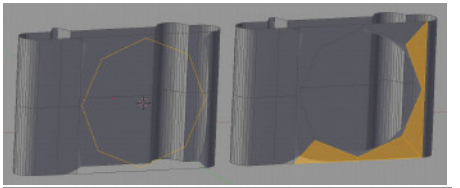


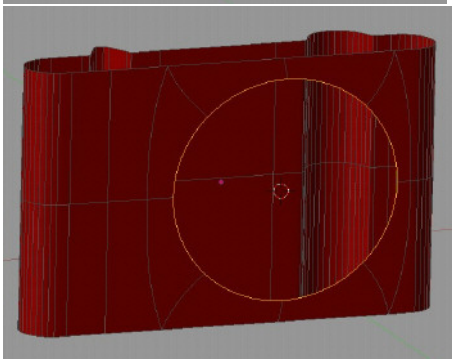
A four sided face does not produce a perfect round circle, thus we need more than 4 sides. For a good NURBS topology we can use a 8 sided circle. To stitch that in, we add a horizontal loop cut to build in the ring opening.



After removing the edges where the ring has to be inserted, we utilize Blenders Snap 3D "cursor to selection" (Shift s) to position the 3D cursor at the right position. We scaled down the ring to the proper size and then start filling in the rectangular faces in between.

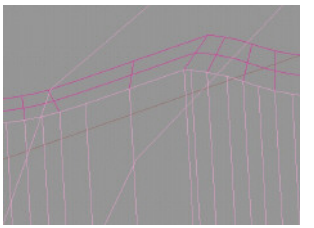


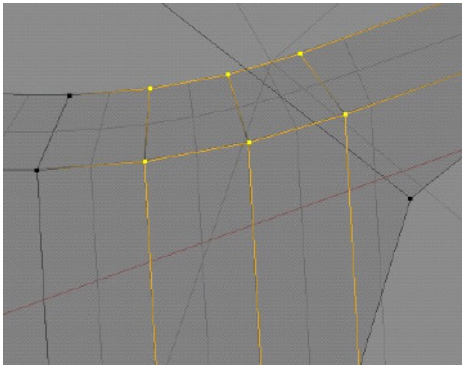




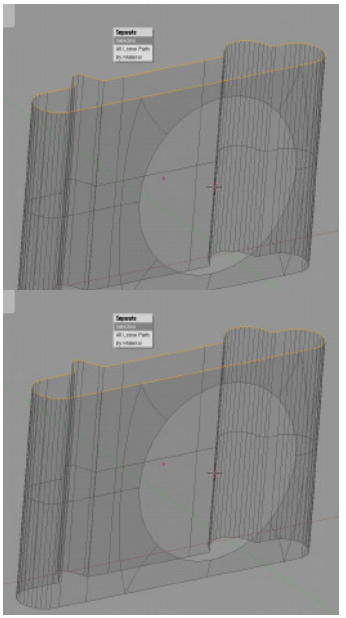
3. Shelling Tops:

The main side is done now. It is very important that we continue working with the same profile of the side to create the faces for the top shells. The reason behind it is that only when the mesh points of neighbouring edges of different mesh patches are at the same positions will we prevent any gaps between surfaces and guaranty creating a solid surface. The following screen shots "1" Object mode and "2" with both objects joined shows the concept behind this.

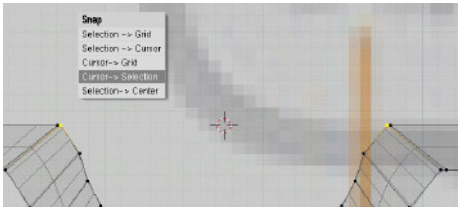




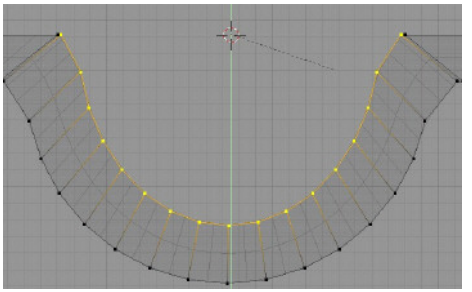
We can select on the ring and hit "y" to split the the ring - it duplicates and disconnects the selection - and then separate it with "p" into a new 3D object.



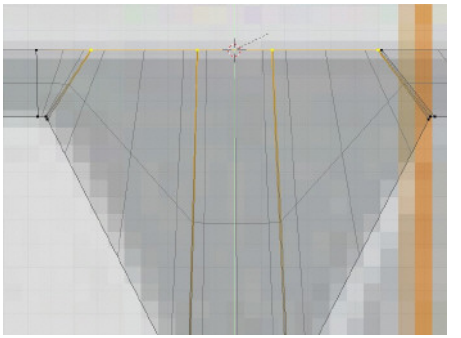
It is time to start working on the top faces. Blenders internal offset tool "shrink" does not always work very good or correctly. Because this iPod is quite simple to model, we can utilize a simple combination of scale and move steps to create the proper first ring on the top face. Use the extrude tool first and then scale and move objects to your need.



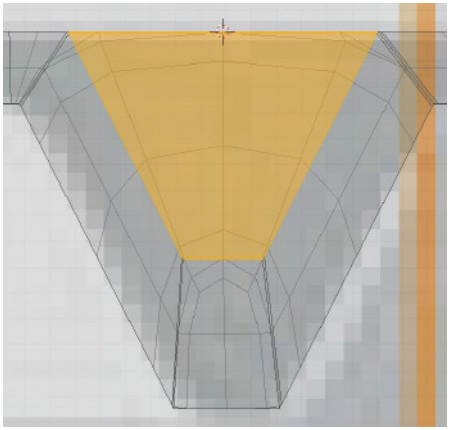
To rebuild the round offsets better, we can make use of the 3D cursor in Blender again. Select the two most inwards vertices and select "cursor to selection" (shift s). Next select all vertices of that round corner, turn on 3D cursor as the pivot point for scaling, press "s" to scale and hit "y" to restrict it only to the Y axis.



The triangular extrusion can be filled. We could use again the "cursor to selection" option and with "s" restricted to "y" and hitting "0" utilizing the 3D cursor as the pivot point aligning all points in a straight line.

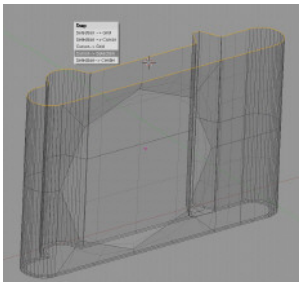


However a smarter solution would be to fill the the faces instead. This would produce a less dense inner profile.

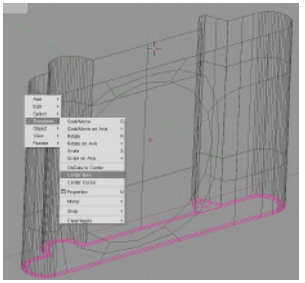


This profile is very similar to the other side of the iPod with the difference that the other side also has the round

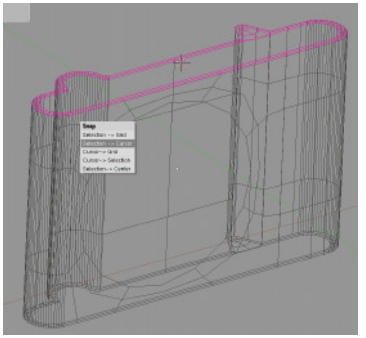
extrusion filled. Because we built the profile already, we can easily copy and paste it. However moving the duplicate to the other side of the iPod main shell is very difficult by hand. However again Blender 3D cursor comes in very handy. Instead of just moving the mesh I am going to snap the 3D object. Completely select the other edge of the iPod main shell and snap the 3D cursor to that position. The 3D cursor is now at the center of the mesh selection. This is very important to be aware of.
In the next step we duplicate the one



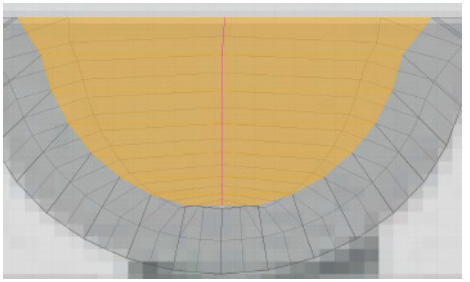
TopShell and reset the center point of that mesh with "Center New" This moves the center point of the 3D object to the center of the internal 3D mesh.



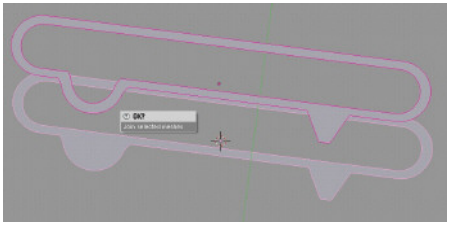
Finally - and never by accident move your 3D cursor - with the duplicated TopShell selected hit "shift s" and select "Selection to cursor". This will more the object center of the 3D object to the position of the 3D cursor. Because the outer profiles are the same between SideShell and TopShell the two objects will perfectly match their edges.



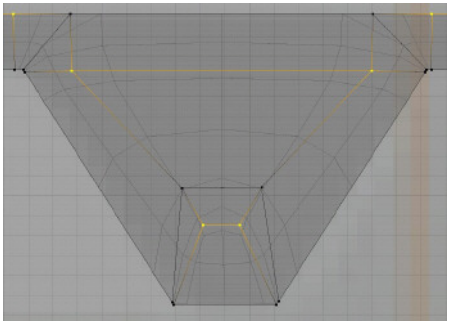
We can now also fill in the missing faces in the round extrusion in one of the TopShells. Because the Ring would force us to build in a triangle we ignored the lower center point, connected all opposite faces and later cut those with a loop cut "crtl r".



This way we get another empty four sided hole which we can fill with a quad.
We have to do some clean up work. In the mesh we built in some edges which are very close to each other. Not always very good with NURBS. We select the two TopShells and with "crtl j" in object mode join them together into one mesh.
Now we can select always the same



points on both meshes at the same time. We moved all those points in the inner profile curve away to form a more relaxed quad structure. Use "g" for moving and press "x" to restrict the movement only to the X axis.



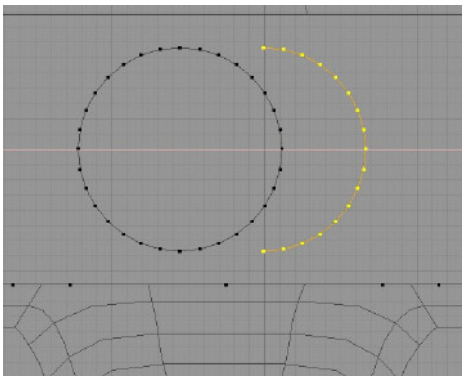
Afterwards we can again separate the two meshes by selecting one TopShell and hit

"p" to separate. It is very easy to select the geometry of a complete mesh with hitting "L" because this selects only linked edges which includes also the faces.

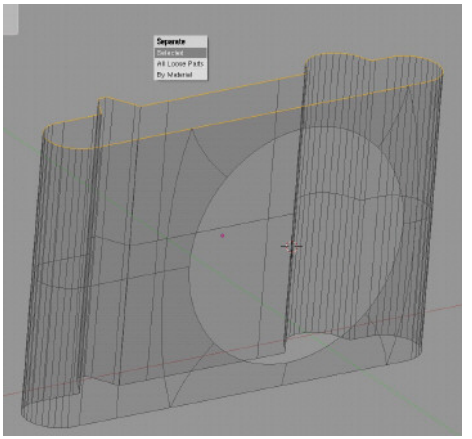
4. Top Interfaces:

After having the outer surfaces created, we could again duplicate and separate the inner profile of one TopShell into which we model in the two trenches for the "Play Order" and "On/Off" button. After having created a new 3D object for the profile set the 3D cursor to the center of the profile and add a ring with 32 vertices.

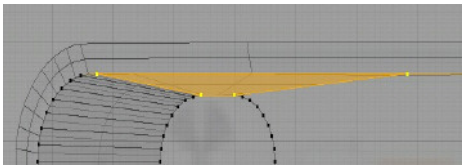
Scale it down and by using the "x" key to restrict to the X axis move the ring to the proper position. Duplicate one half move it to the side of the trench remove all un-needed vertices and fill in the missing two edges. You can duplicate that profile and move it to the other side where the second trench is.



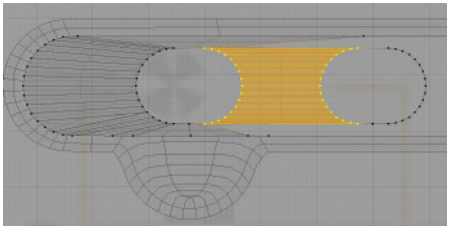
Now comes the tricky part. We cannot just fill all faces in between with "shift f", because this would just plainly create an enormous amount of triangles which are not suitable for a good SDS to NURBS conversation in Maya for example. So we need to count a little bit the points on the ring of the trenches and the outer profile and see how we could fill in four sided faces without any triangles.



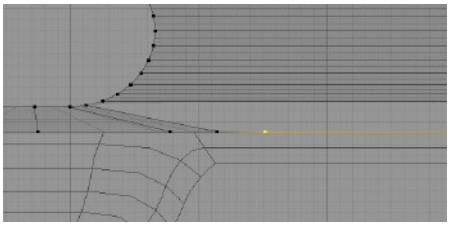
As you can see I subdivided the lower edge of the trench profile to make it match to the points of the outer profile better and then you can start filling in all the faces. Just continue to fill in faces on the left side of the trench.

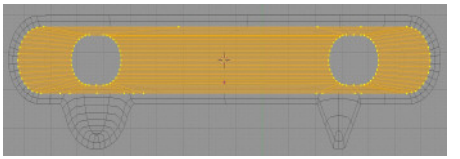


Right now it is a smart idea to just connect the two trenches with each other to form good geometry. For a smaller screen shot I moved the right trench close to the left one.

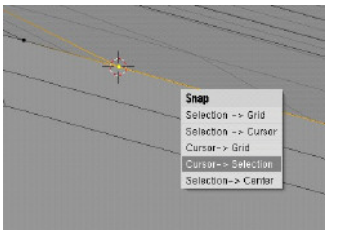


To finish filling the face it was necessary to subdivide one edge of the outer profile.

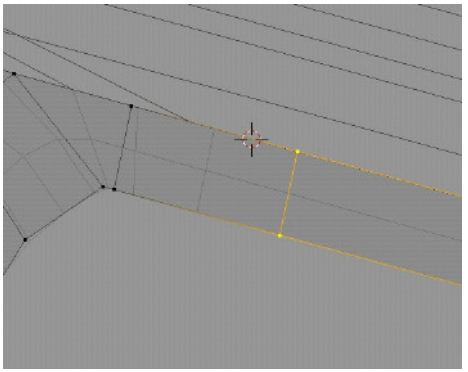


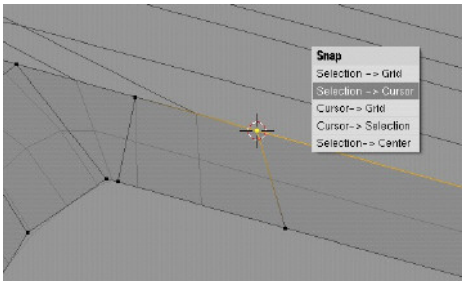


Because we added geometry to a profile, it is wise to add this also to the other two surfaces as well. This can be done very quickly. Select the added point and snap the 3D cursor to it.

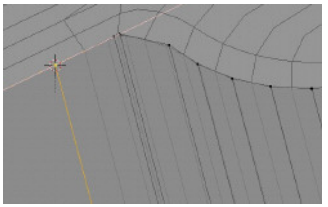


Set the pivot point to the 3D cursor and for example go to the top mesh and add another vertical loop cut. Select the added point in the inner profile and with [Shift+S] "selection to cursor" move that point to the 3D cursor to match it with the inner surface.

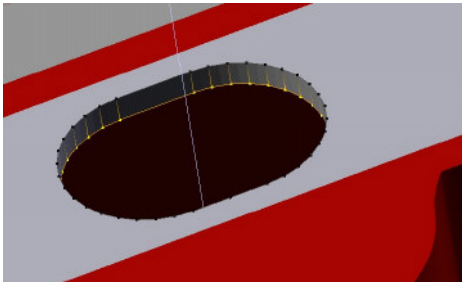




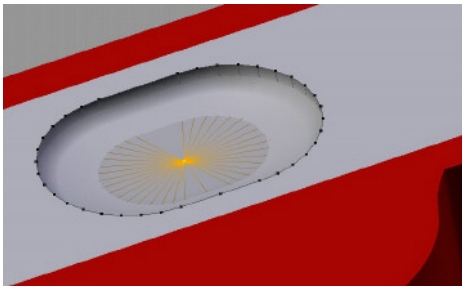
This procedure has to be repeated also with the other surfaces. The following image shows the changes in the side surface of the iPod.



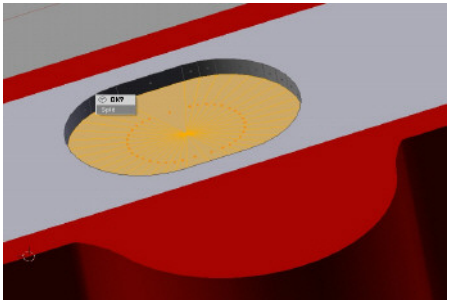
Now it is time to give the trenches some depth. Select one trench profile duplicate and separate it. In the new object select that profile hit "e" to extrude and press "esc" to prevent any movement. Press "G" with "Z" to move along the Z axis and type in ".02" to create an extrusion with a depth of 0.02".



To close the hole, select the end ring and press "s" to scale and type in "0" to scale down the extrusion to close the hole. For this you need your pivot to be set to "Median Point". Be careful not to merge or remove the doubles because this would create undesired triangles. Scaling to "0" closes physically the surface because the vertices and edges of the ring that occupy the same space and thus close the surface.

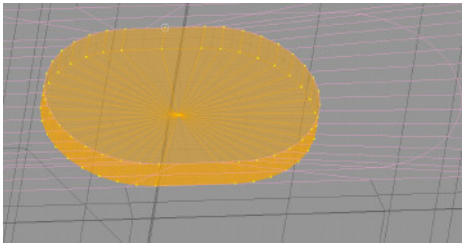


To remove the rounded edge all we need to do is to select the lower faces of the cap and hit "y" to split it apart from the main mesh. This will discontinue the flow of the surface because internally we have 2 meshes now in one object.



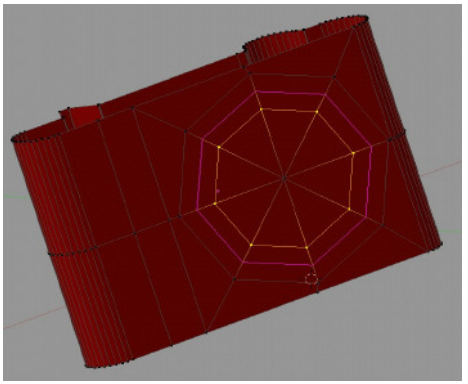
Because the two trenches are built from the same beginning profile we can utilize the new "vertex snap" tool in Blender to move a copy of the trench to the other opening. Move the copy closer to the designated hole. Select first the TopShell and then shift select the duplicated trench and go into "Edit Mode". By first selecting the TopShell we can make the new snap tool also work with geometry of a different 3D Object. With the complete mesh selected, move your cursor close to one vertice and press "g" and than "crtl" to activate the snap function. When you now move your cursor closer to the position where in the other mesh the neighbour vertice is, the Blender cursor should turn into a "White Circle" and snap to the position of that neighbour vertice.

Click here and because we had all the mesh selected everything is in place now.

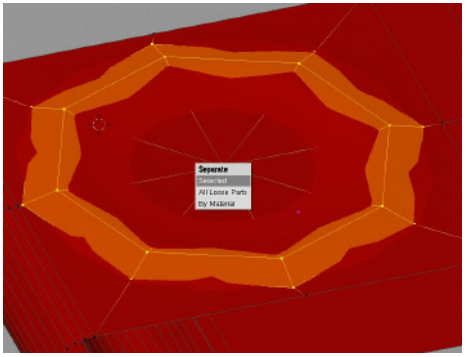


5.Dial Ring

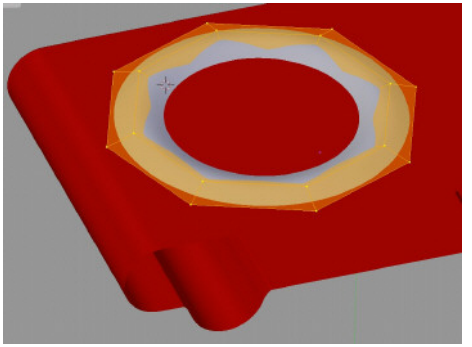
To build the dial ring is just a snap. All we need to do is select the ring of the opening of the side mesh and hit "e" to extrude it and with "s" and "o" to scale it down to close the hole. With "crtl r" we can insert two more rings at the correct positions which describe the geometry of the inner disk.



Selecting the inner loop ring of the dial ring geometry and move it a little bit outwards. Select all faces of the dial ring and separate it with using "p".



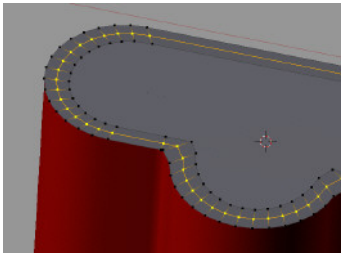
You can give the new ring object a different material to let it stand out more. By increasing the subsurf level to something like 3 you can evaluate your design and you will see that all edges of the 3D objects match perfectly.

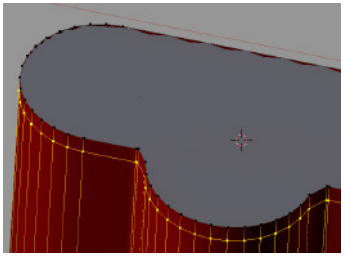


6. Fillets:

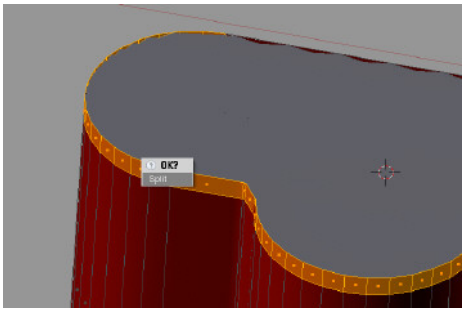
Fillets, blends, and complex chamfers are a prone tool for NURBS because applications like Rhino or Cobalt can calculate matching tangency between the edges of the blend and the surfaces automatically for you. Modeling the Dial Ring or the Side and Top Shells is also a good approach on how fillets, blends or chamfers could be included in Blender. However they only work good when the patch edges show the same geometrical structure. Since NURBS fillets are calculated to match the tangency you have to model this by hand. But this actually also allows you to create very irregular and custom blends which might be much harder to do with NURBS. After all those SDS blends can easily be converted into NURBS patches!

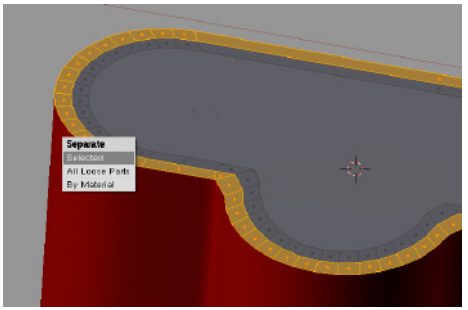
The last scene inside the iPod demo blend file covers the this topic. Because the iPod model is built through separate shells it is very easy to model in the desired thickness for the blend surface utilizing "Loop Cut" on the Top and Side Shell.

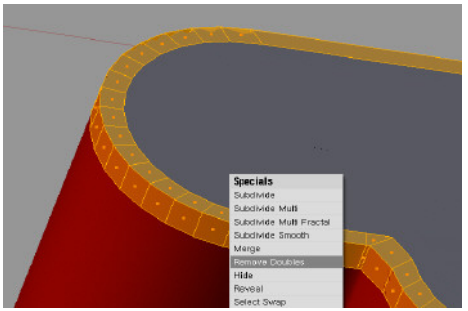




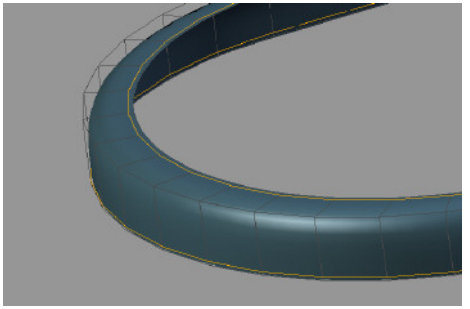
In the next step we select those face loops and separate them, join them together into a new mesh, and finally remove all doubles. Again make sure that your "Remove Doubles" is set to 0.000 and that all surface edges match each other in position and vertices.





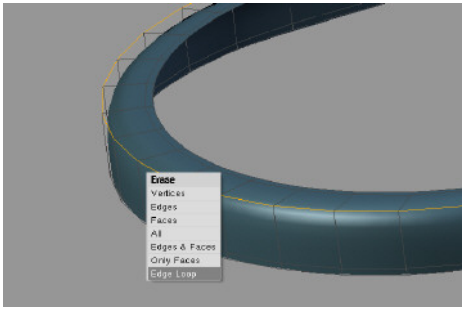


Add on each end another Loop Cut. We have now a nice round Blend - however not a radial Fillet.

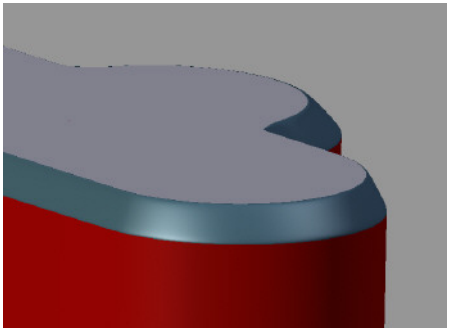


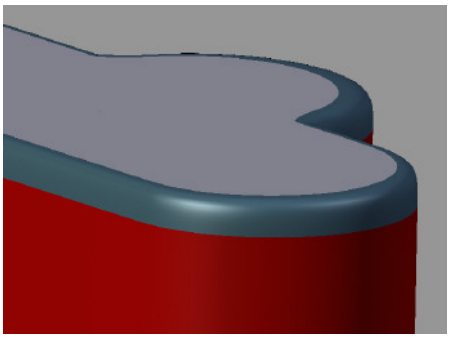
In case you desire a radial fillet the situation is not that easy. A 3 point curve cannot produce an arc with polygons. You would have to add an additional Loop Cut and spread out the loops.

To create a Chamfer, just remove the Loop at the center of the Blend with hitting "x" and selecting "Edge Loop". This produces a Chamfer with soft round edges flowing into the neighbour surfaces with a matching tangency continuity. In case you want to have very sharp transitions, just remove the the Loop Cuts we just added.



Take a look at the following two images how the Blends are integrated into the iPod model.

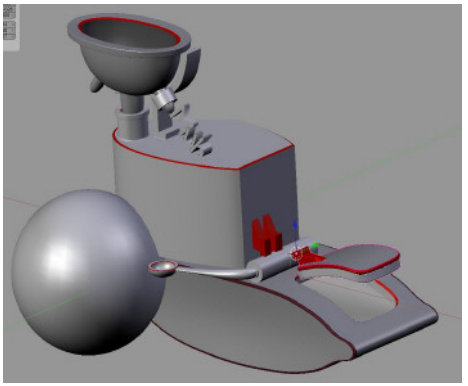


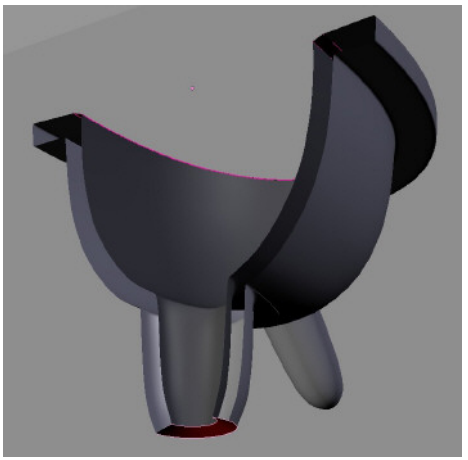


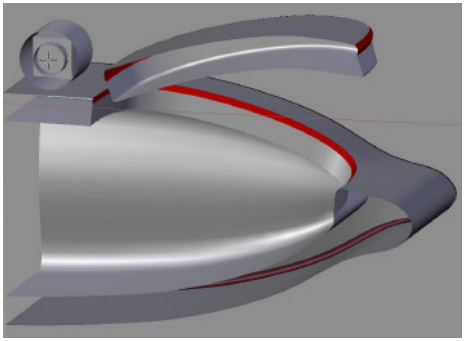
Finishing up the modeling should now be very easy The model is now ready to be imported into Rhino for example for further more complex NURBS applications.

Additionally, take a look at these three images showing an early stage of a new project I am working on. Everything in red are Chamfers and Fillets. You can see how useful those are.

However to build a Blend between the main body and the huge sphere is more than complex and rather impossible when you want to prevent distortions or triangles. This task would ask then for finishing the job in a NURBS application to create this complex Blend. As a rule of thumb, Blends between cylindrical objects or on a flat/planar surface are quite easy with Blender.







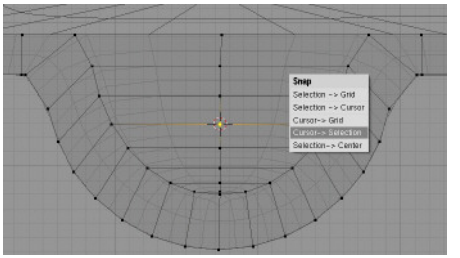
Part2: Product Interaction

Blender is not only a modeling environment for Industrial Designers, it also offers very good tools to evaluate the interaction of the product in much more sophisticated way than Rhino for example can do it. Simple bone animations are only possible in Rhino via a commercial 3rd party plug in. Blender in contrast, comes with a very rich tool set. As a simple example lets us evaluate how the paper clip was modeled and if the rotation of it will allow it to create a big enough gap to push for example some fabric between the clip and the iPod body.

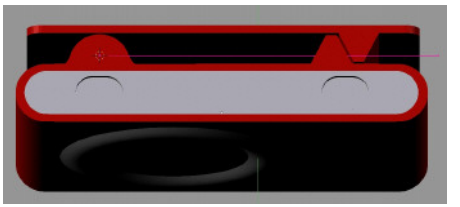
For that we are going to use the "Armature" system which is restricted in its rotation and linked to an empty for simple and easy bone animation.

1. Placing the Bone

From the top view we have to find the right center of rotation for the paper clip. I make use of the geometry of the Top-Shell as can be seen in the following image.

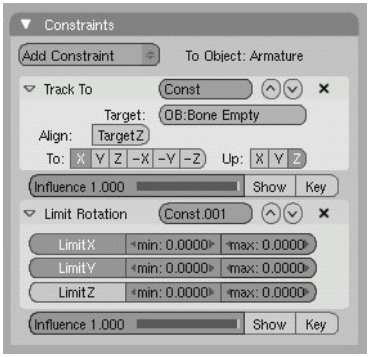


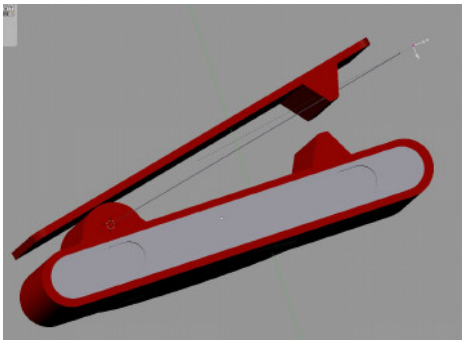
At that position we add a bone by adding a new "Armature" and move the other end of the bone to the other side of paper clip. To make the bone less distracting you can set the display style of the bone to "Stick" under the "Edit Buttons" menu.



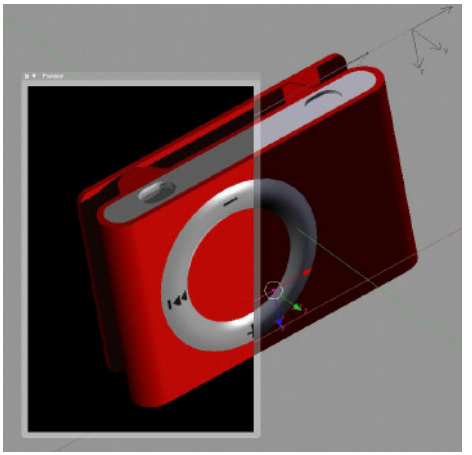
Switch into the "Pose Mode", select the Clip first and second the bone. By pressing "crtl p" you can now parent the Clip to the complete bone. Please pay attention to the information for the Clip. It says it is parented to the armature, but also to a complete bone inside this armature.

Lets add an empty, rename it "Bone Empty" and move it over to the other end of the bone, away from the axis of rotation. Inside the "Object Buttons" "F7" add a "Track to" Constraint and make the bone look towards the empty. You might need to have to reset the "Align to" and "Up" vectors. If you now move the Empty you will see that the bone will always look at it and thus moves the clip accordingly as well. It might be helpful to also add a "Limit Rotation" Constraint for the X and Y to prevent any rotation along those axises. This also helps to control rotations in perspective view for example.





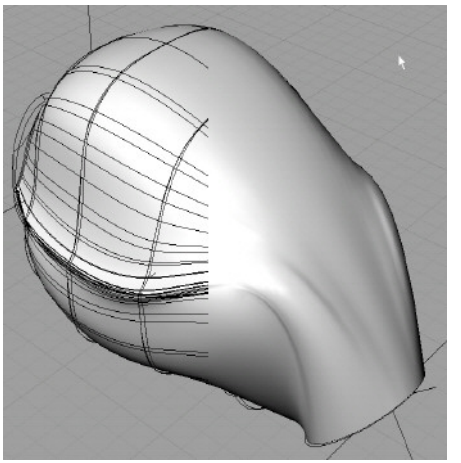
In addition to that, texturing and rendering is by far more sophisticated than in solutions like Flamingo. The easiest way to decal the Dial Ring for example is to set the 3D cursor to the center of the mesh and while you look perpendicular onto the surface add an empty. Rename it to something meaningful like "Control Empty". Apply a material and load a texture. In the blend demo file you can find a control image. In the "Map Input" field select "Object" and enter the Empty name. The only thing left is to scale the empty to the right dimension so you can see the texture correctly.



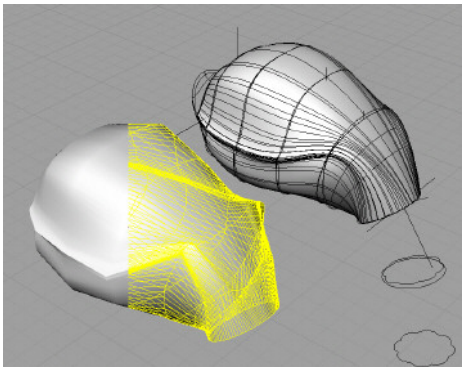
II Case Study 2: Reverse Modeling from NURBS to SDS

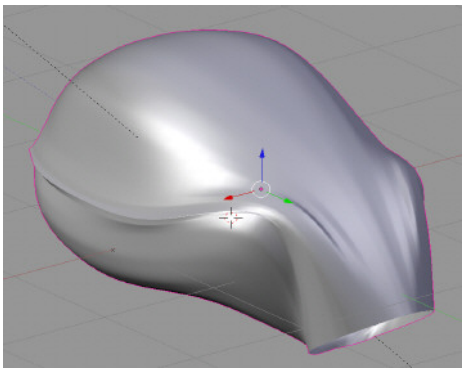
The following project illustrates how Blender was used to finish up the model for a printing on a liquid polymer 3D Printer to create a model which can be casted.

NURBS patches by nature only allow even U and V subdivision. You cannot let 2 or more iso curves merge in a single one. The following image shows the serious problems. The crease of the sides is formed through having few iso-curves very close to each other at the side of the head. Seen from the side you also can see that those curves flow upwards closer to the neck while the neck itself curves downwards. An attempt to spread out the curves along the neck on a circular path is not successful.

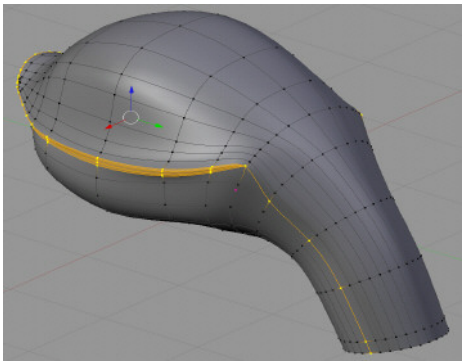


Luckily Rhino has an option not to only mesh NURBS into a form fitting polygon mesh, but also to mesh the control cage of the NURBS object into a low polygon cage which can be imported into Blender and then cleaned up - meaning simplified.

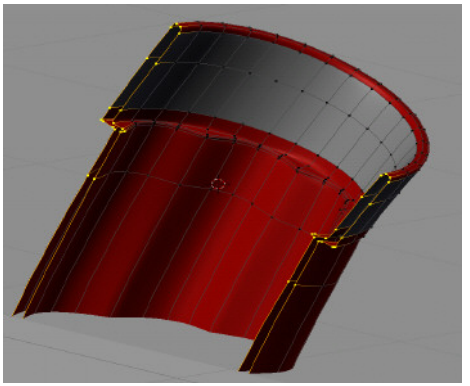




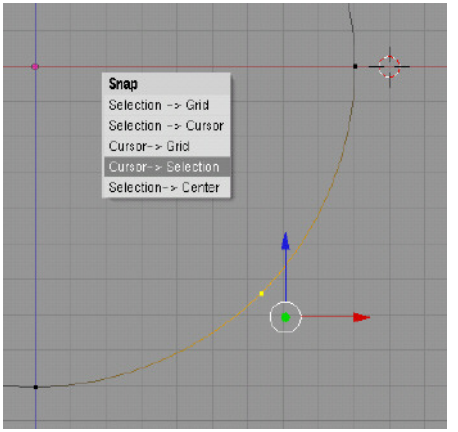
The fourth image shows the cleaned up version and illustrates one of the great gifts of polygonal modeling, merging edges. Hence the next stage would be the STL export to send the model to the 3D printer, we do not need to convert it back to NURBS because Blender also has a quite good STL exporter build in.



Interestingly enough, for applying a thickness, Rhino is not much better. Rhino also produces quite a few problems and it was faster to get the Spout turned into a Solid in Blender than in Rhino. For building thickness Blender has a very nice visual tool. When you press "Alt b" you can draw a selection in the view port which will exclude everything outside that selection visually.



However, just because you do not see the hidden geometry, it does not mean you cannot affect it. A loop cut selection will also select those vertices which are hidden. Utilizing the "Edge Length" option I was able to measure the thickness of the the shell. However there is one problem. Blender does not allow you to snap vertices to the smoothed surface of the subsurf modifier. Blender only snaps to the low polygon control cage. As you can see the 3D widget is positioned at where the control cage vertice is and the 3D cursor also jumped to a similar position instead to the surface. This sadly also applies to the new Snap tool as well and makes it a bit less useful with subsurf meshes in some cases.



So you either have to bake a copy to work with and to draw in a reference line for the thickness depth or you draw that line and by hand carefully match it with the subsurf mesh.

III Afterthoughts:

It was very interesting to teach Blender first to my students because it seemed to help them more to understand how a good mesh structure should be created in conjunction also with object animation and rendering. After they were introduced to Cobalt and Rhino, a few students mentioned they will go back to Blender and only work there. However the attractive point I strongly needed to make them aware of the pure fact that Blender is not a CAD program at all and it cannot replace in any way NURBS is that with SDS you now have 3 possibilities to approach modeling a product. As much as you can start with a solid cube in Cobalt and step by step cut away shapes and afterwards turn everything into NURBS patches for further refinement, as much can you start sketching out your main proportions in SDS and finish it in Rhino with NURBS.

This is a work flow not many Designers know about, many even do not understand it and claim it as being rubbish. However those who understand the deeper design philosophy and compatibility of those three modeling methodologies are very exited about this change finally taking place. Sadly, only Gestel Solidthinking does provide all three tools in one application since over 5 years. However the mesh tools are hardly paid attention to.

NURBS are great, they are precise, safe work, but as Solids, are not the ultimate solution to CAD modeling. With this emerging new technology I also hope that there will be a change in the acceptance which will hopefully will also influence the strongly established Industrial Design formal language which is clearly influenced by the stiffness of NURBS and Solids.

Because Blender is free, and T-Spline plug-in only offers few modeling features and Blender in addition also provides a complete set for animation and rendering I hope that it's importance will also merge more into the field of Industrial Design.

IV Tips & Tricks

Modeling:

- *Always have 4 sided polygons.*
- *Model as it would be fabricated.*
- *Always keep neighbour edges having the same vertice count at the same positions otherwise the edge geometry will not match.*
- *Use scale "s" and hit "0" to close a surface but do not merge to keep quads.*
- *Use proper names for all your objects to organize your scene better.*
- *Re-center your 3D object centers*
- *Make use of the 3D cursor for 3D object snapping.*
- *Make use of the 3D cursor along an axis to align points.*
- *Make use of the different pivot points.*
- *For STL meshing always make sure all objects have the same subsurf level settings otherwise the edge geometry will not match*
- *Two faces can now be bridged with pressing "f" and selecting "Skin Faces".*
- *To break the flow of a curve you can select the edge and hit "y" to split it.*
- *If you re-import an STL mesh set the "Remove Doubles" Limit to 0.000 this way only truly matching vertices are being merged.*
- *You can model fillets, blends, and chamfers by hand as separate patches to round edges*
- *You can make use of the new "ReTopo" to draw over dense imported mesh a more clean and organized mesh. it just has to be a fine one to match the imported mesh curvature.*
- *Make use of the "Volume Clipper" "alt b" to hide unwanted geometry instead of using only selecting face you want to hide.*

Interaction:

- *Hooks can be very useful to quickly move a cable*
- *Use "Track To" and "Limit Rotation" Constraints to prevent unwanted movements/rotations.*
- *Empties in this case provide perfect alternative controls to work with.*

Links

SNAP information:
http://www.blender.org/development/release-logs/blender-243/transform-snap/

Retopo:
http://www.blender.org/development/release-logs/blender-243/retopo/

Object Hooks:
http://www.blender.org/development/release-logs/blender-235a/object-hooks/
http://wiki.blender.org/index.php/Manual/Hooks

Pivot Points:
http://wiki.blender.org/index.php/Manual/Pivot_Points

Axis Locking:
http://wiki.blender.org/index.php/Manual/Axis_Locking

Constraints:
http://wiki.blender.org/index.php/BSoD/Introduction_to_Rigging/Constraints_and_Axis_Locks

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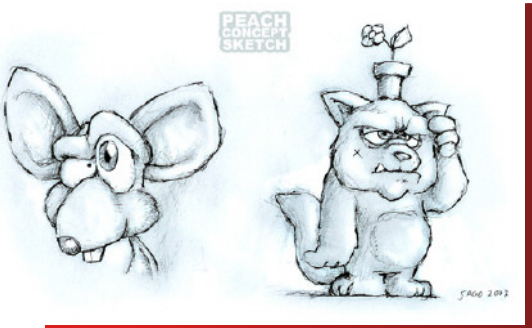
Focus on Functional Graphic and Product Design

After grad school I taught for one year at the University Wisconsin-Stout where I introduced Blender for industrial design and interior design to students. Through that exposure to the students I focused more on researching the usability of Blender for this field.

It has increased my knowledge and understanding to see how NURBS and SDS can be combined in a professional work flow for CAD and Rapid-Prototyping using Blender Blender proved itself to be actually not only quite useful but rather being a real treasure and workhorse for the design students.

www.ckbrd.de |- info@ckbrd.de | 715 309 9795



Project Peach!

Animation Short by BlenderFoundation

Preface

The Blender Foundation has initiated another open movie project, "Project Peach". Following their successful formula from 'Elephants Dream', they have again gathered a small team of talented artists to work in the new Blender Institute to create a short animation.

The creative concept of "Peach" will be completely different from that of the "Orange" project. This time we have been promised funny and furry!

Who

Sacha "Sago" Goedegebure, (Netherlands), and Lyubomir Kovachev, (Bulgaria), have been approached and accepted the invitation to lead the project. Together with producer Ton Roosendaal, they have picked the other team members. They will be defining the concept and get the script ready for production. Andy Goralczyk, (art director of the former Orange team), has also joined the team, bringing his experience from "Project Orange"

The other team members are:

Enrico "EnV" Valenza (Italy)
Nathan "Cessen" Vegdahl (USA)
Brecht van Lommel (Belgium)

Jan Morgenstern has agreed once again to sponsor us with his wonderful music and sound design, including all editing facilities of his Wavemage studio.

As spares on the waiting list (if drop-outs, or if get extra funds become available):

Colin Levy (USA)
William Reynish (Denmark)
David Revoy (France)

When

The project itself has been scheduled to be executed in six months, starting on October 1st 2007.

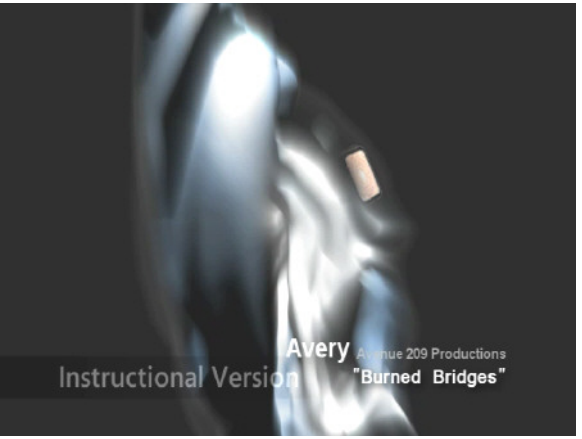
A couple of (tentative!) milestones:

- June 16: Public call for portfolio submissions.
- June 26: Closing date for submitting portfolios.
- June 30: Announcement team (+ define spares).
- July 1-15: Decisions on team roles, concept, how to get script, contracts, payment details.
- August 3-12: Siggraph, San Diego.
- August 17: Final decision on project duration and team size.
- August 20-24: Pre-production workshop with script writer, with a script!
- Final contracts signed with all team members.
- Sept 1: final script.

Sponsors or Partners

As for Elephants Dream, they are again looking for sponsors in many areas;

- Hardware (computers, screens)
- Render farm
- Film transfer



Walkthrough - Texturing in “Burned Bridges” Music Video

- by Avery Lanier

Introduction

I'm just your typical polymath that will try to be efficient at anything that I touch. Though I am an Audio Engineer/ Musician, and Video Editor, naturally I am also a 3D artist. As can be seen, from the music video I was producing- the three fields play very well together. In this tutorial, I will focus on my texturing technique for the "path" and another mechanical item in the video. As you can see, the renders, which only took about 12 to 15 minutes per frame on a Dell core duo 2.0 gHz, have a lot of techniques utilized from Blender which can be discussed at a later date.

The Goal

First of all, it's important to note that speed was one of my primary concerns. So, I had to make sure that a seemingly complex and detailed scene could be rendered quickly. Therefore, it was very necessary, as with a real-world videographer, to plan my camera shots carefully.

This way I could eliminate any models from a given shot that would lengthen my render time. Finally, I appreciate highly detailed and complex models and scenes, and the time and artistic ability that goes into them. I would like to say however, that depending on your shot, it can be a waste of time if your goal is not just to produce art, but have a production with a scheduled release date. I have seen very large production file scenes that have beautiful models but take forever to render. Thus enters texturing...

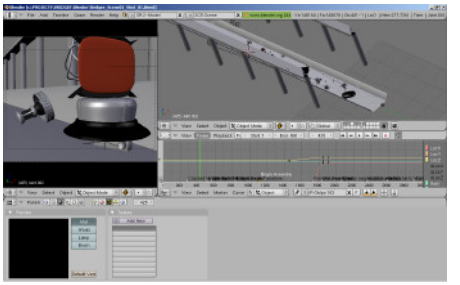
Technique

Fortunately, this will not be a lengthy, complex tutorial, (just the previous intros), because I love simplicity. I believe skill should use the simplest route to achieve the best results. So the technique is really simple, and one that you probably could easily guess, but it works when done correctly.

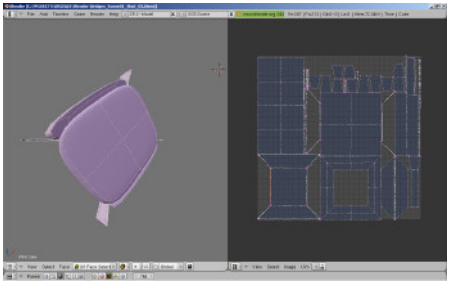
A simple overview to the method is to make a UV map of the object you wish to texture, tweak it in GIMP or Photoshop, make varied layer maps, and import them into Blender to use in various channels.

Step 1: Make a UV Map

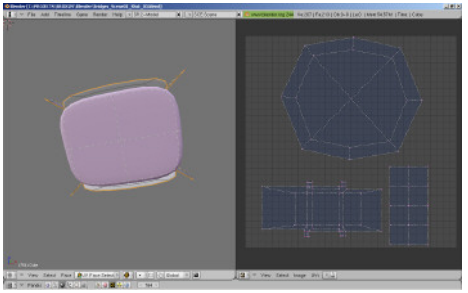
Mapping a box or a flat plane, (As is the case with the video), is easy. However, as a brief side note, what if it has much more detail? Lets take one of our machines as an example.



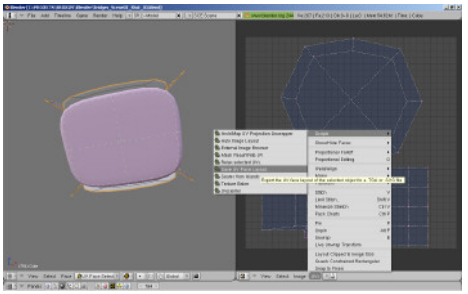
If you unwrapped this using the standard unwrap algorithm, this is what would happen.



If this is not what you want, then you have to use your seams. Switch into edit mode. It is a good idea to make seams where the texturing is insignificant, (such as areas that will not be seen, or are a solid color). For example, making a seam in these places works well for this object.



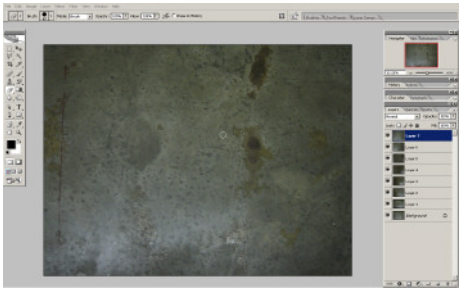
After unwrapping your object and lining up your vertices, save the UV layout as a picture. I use the "Save UV Layout" script under UVs:Scripts:Save UV Layout.



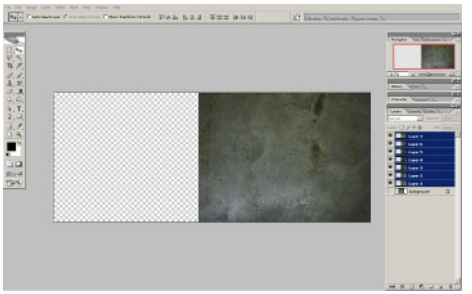
Step 2: Paint the UV
For this part we will texture the flat plane called the "path". I wanted a realistically varied texture for the path, so I did not use a repeating pattern- in fact, I didn't even use a UV map! Contradictory? Why? Because I wanted the scale of the photos to dictate the scale of my object.

This method to my knowledge only works with a flat plane. Remember, this is art- not only technical skills- there's more than one method for doing anything.

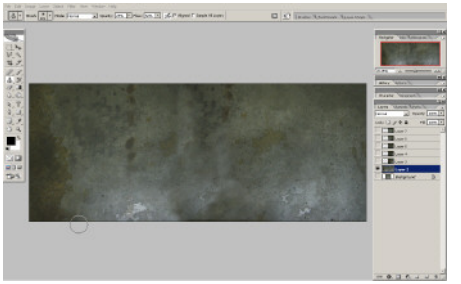
For the path, I snapped several photos of concrete. I tried to line them up like a panorama (making sure the edges line up). Some cameras have a built in function for this.



I then imported the photos into Photoshop, (Or GIMP), into separate layers.

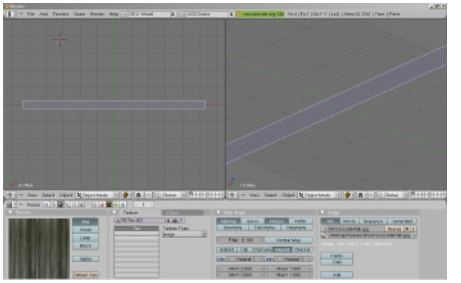


I kept changing the document size as I was assembling the photos from left to right.
I merged the two selected layers and turned the rest off. I then blended the edges of the photos using the clone tool set to a really low opacity and soft edges.



Once I finished assembling the entire path, I saved it as a JPEG, (Very important to do this if you are using YAFRAY).

Step 3: Rendering
Once you've placed the photo onto a plane inside of Blender, select the plane, hold down the ‹alt› key and type ‹V›.



This allows the plane to jump to the proper proportions of the photograph. You don't even have to guess if your plane proportions are correct! Yes, it was that simple. Very low polygonal count, excellent texture, fast rendering- welcome to the world of productivity!

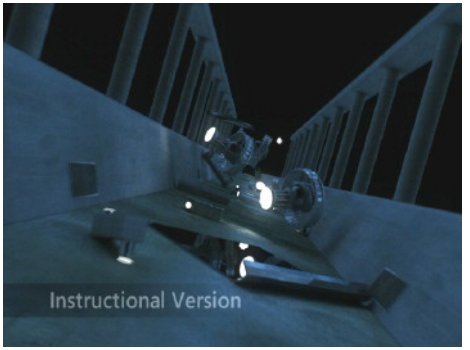
Conclusion

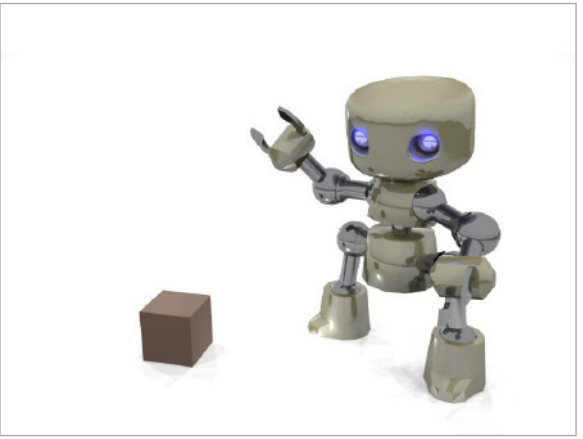
Of course there is much more going on in the scene, so I invite you to analyze it. As an imperfect human, I can assure you, it's not perfect. Perhaps you can give me some suggestions. At least I hope it contributes to learning the techniques and creates more levels of skill in using Blender.

Till next time...

avery@avenue209.com

The video can be viewed at:
The password is: Bridges
http://www.4shared.com/dir/3134253/c9917fad/sharing.html





Walkthrough - Unsolved Mystery Short

- by Giancarlo Chan Ng

Introduction

"The Unsolved Mystery" is the title of a very simple 46 second CGI animated film created by the author. As a first work, the objectives were all very simple from the outset, but the experience of the author can be relevant for beginners hoping to breakthrough from visualizing something to actually creating a finished work. This article effectively covers key points in this author's first attempt at creating a production work-flow for a simple CGI film. The article will focus on aspects of the work-flow related to the production of the Mechanical Actor, explaining the modeling and animation solutions used in the aforementioned short film. In the last section the author will discuss certain pitfalls and possible improvements that other beginners can take note of.

Robots as a Beginner's Concept

My previous experience prior to "The Unsolved Mystery" was that I would immediately attempt trying organic actors and CGI humans, thus resulting in being overwhelmed at my current level of knowledge and simply not really finishing anything.

I knew that to be able to actually progress and finish a film as a beginner, I only really needed to work with something very simple to get things going.

This is the point at which I decided that the subject of the film would be a ROBOT. Robots are quick to model, easy to create armatures for, and do not have to organically deform at all. If necessary, a robot design can free the artist such that the robot can have irregular shape, wheels, tracks, or legs. Colors and lighting for robots are attained easier compared to those of most organic actors. The other big bonus is that since each part is totally independent of the other, robots are easily created by combining different objects or meshes, unlike in the case of, say, Organic Actors where usually it is expected that co-joined parts like arms and shoulders, practically the whole body in some cases, should be one mesh. This allows a beginner to experiment with less risk involved and make straightforward corrections to small parts like fingers, shoulder joints, and arms.

Therefore, whatever the film's theme or message, I knew that my best bet to finish a short production at a beginner's level would have something to do with a mechanical actor. So from this point, the concept was more or less fleshed out: "A simple robot actor in a simple situation."

In my opinion, robots make for the best first subject for beginners. Robots are also a very close real-world equivalent to early simple actors used in some more formal CGI study courses. So to me, the idea of Robots as a beginner's concept seemed very logical.

Story Treatment & Research

Prior to designing the robot, I had already fabricated beforehand the Story and Message for "The Unsolved Mystery". Story and Message are important because these can be relied upon to make demands on production design and serve as the guiding vanes for any CGI project.

For example, for "The Unsolved Mystery", to convey a sense of wonder or curiosity, the robot lead actor had to have a child-like or toy-like quality. It was especially important to convey this visually because there would be no spoken dialogue. Early on, I originally dawdled at the idea of a robot with caterpillar tracks, but a script demand for having the robot bend down to pick an object up meant that caterpillar tracks would be a tricky solution.

These, and other similar considerations, help to guide the Design, Modeling, and Animation process.

The other important activity prior to actual Design and Modeling is research. Even if one knows what something looks like, it usually pays off to have research because the mind plays tricks and tends to miss out on details that later on can become important to achieving an intended result. For Jules The Blue-Eyed Robot who appears in "The Unsolved Mystery", I procured pictures of many kinds of robots and their representations such as factory robots, movie robots, or toy robots.

Armed with the story and the research, I took my pencil and started designing the robot I had in mind with an eye towards how I could create the robot in Blender. After making about three or four very varied designs, I settled on a diminutive toy-like figure with a humanoid shape, stubby legs, and hands inspired by old 1950's robot toys made up completely out of cylinders and ball jointed limbs. I had drawings of the character in various positions that can be expected given the script and the storyboards.

Production Design & Pre-Production Testing

For modeling Jules, I only really needed two skills: KNIFE and EXTRUDE. The basic principle is to distill each part of the robot into one of Blender's basic shapes and then knife or extrude until the right shape is attained. Sometimes it is helpful to have a preliminary mesh-like sketch of what is to be expected already in Blender's environment based on the approved production design. Each cylinder, ball joint, or polygon is a separate mesh.

The figure (Fig. 1) below shows each phase of the modeling progress. In every situation, the principle described above is used. The only exception is the mesh for the head which is the only part of Jules to use a SubSurf modifier with Set Smooth to achieve a rounded look.

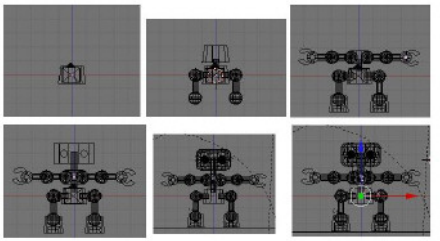
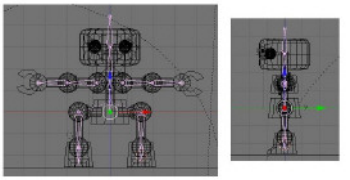


Fig. 1: Modeling Progress

The figure (Fig. 2) below illustrates the arrangement of the armatures. For mechanical objects, I found it best to parent the individual meshes in Pose Mode with each bone in the Armature. Parenting to the bones this way allows for "simple parenting". Simple parenting of meshes to bones results in no organic deformations.



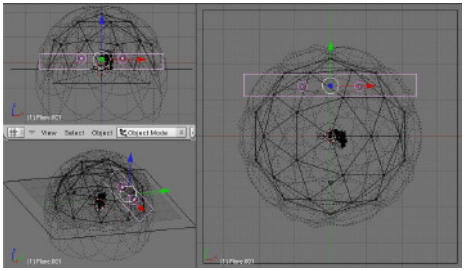
A minor note must be made here about the EMPTY that is located at the hip area. This is simply used as a handle so that I can drag Jules anywhere and flip him about by simply selecting the Empty. Their relationships are: Each Mesh's parent is the closest Bone by simple parenting. The Armature's parent is the Empty.

One thing I learned prior to making "The Unsolved Mystery" was that a mesh's final look relied as much on surrounding objects and light as well as its own structure and materials. Below are some of the conditions created for the test render to create the final look of Jules the Blue-Eyed Robot:

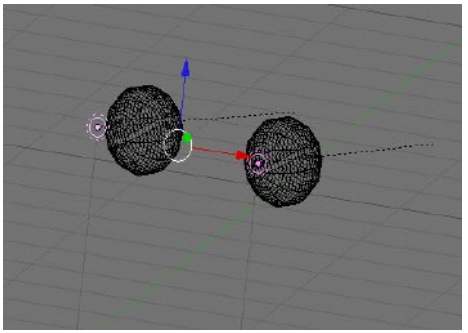
Copper Material (Head, Hands, Upper Torso, Lower Torso, and Lower Legs):
Gun Metal Material (All ball joints, Upper

Arm, Fingers, Upper Legs, Hip Joints, Shoulder Joints, Waist, and Neck):
Set Design: (Sky Dome) Note: Material is

simply White with maximum values of Reflection and Specularity. The Extra Plane ("Reflective Panel") shown in Pink has the same material and is us used to allow the "horizon" of the Sky Dome to vanish when viewed by the Camera as set. See Fig. 5 next.



The Reflective Panel is set with two extra lamps that are setup as shown below (Fig. 6):



Lights Settings for Spot Lights Fixed to Sky Dome:

Eye Material and Lighting – A special note at this point about eyes, the eyes here are simply Blue Metal spheres, but to help create the illusion that "there's something going on behind them", one trick is to have the eyes on another layer and create a pair of lights aligned some ways upper right or left in orientation to the eyes. This helps create brightness and a sense of life. The lights of the eyes must affect only the layer where the eyes are on. Without the eyes arranged in their own separate layer with special lighting to enhance them, they can become vapid and lifeless.

The separated layer, Blue Metal Eye material, and lights affecting this layer only are shown below (Fig. 8.).

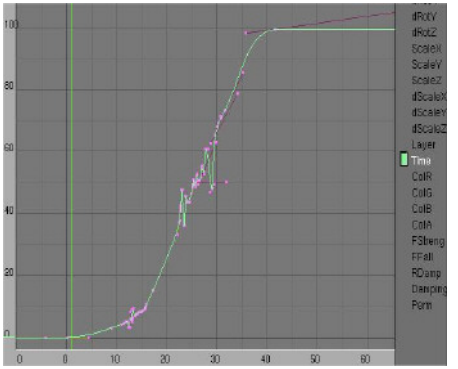
Animation

All the animation seen in "The Unsolved Mystery" is done with a method inspired from the "Go-Motion" photography method used for miniatures, such as the Cave Roller Coaster in "Indiana Jones and The Temple of Doom".

The principle is that the Armature has each motion Key-Framed in gaps of 20 or 30 frames, and then one uses the IPO Curves to manipulate the frame speed of the motion.

Making the initial Key-Framed movement can be tedious and requires a lot of imagination. Note, for example that sometimes to animate a figure bending forward, the first few frames actually have the figure bending back as if to "rev up" the motion. Similarly at the end of each movement, the motion's final frames exceed the mark at which the motion should stop. This last trick helps to create the illusion of Inertia.

When manipulating the IPO Curves, I follow one rule: "Jagged Is Good". Of course, to avoid rickety motion, most of the IPO will be smooth, but making the IPO jagged can be used for life-like emphasis and can create sensation of weight if done properly. An example of the IPO



Curve from the "Shutdown" shot that occurs at the end of "The Unsolved Mystery" is shown below (Fig. 9):
Each shot in "The Unsolved Mystery" is actually a separate Blender file with copies of Jules, the set, and the Mysterious Box. As a result of this, each Blender file contains only the animation and the corresponding IPO Curves for each specific shot.

IPO Curves control everything in "The Unsolved Mystery", even the Energy for lights affecting the eyes also use Lamp IPO Curves.

Audio

All the audio attached to Jules' motions in "The Unsolved Mystery" were salvaged from free web sources only after the images were committed to production. This is a mistake, and the flawed matching of the audio is very apparent. I am only writing this down as a warning to other beginners: "Always have Test-Audio ready soon after having a Script".

To end this feature, I would like to extend a note to beginners in CGI, or CGI hobbyists. Projects with mechanical and non-deforming actors are not only fun and fulfilling. They are a very quick and reasonable way forward to creating those first few projects. In fact, if one distills some of the fundamentals of animating and creating Mechanical Actors, one will find they are subsets to more complex objects and projects, including Organic Actors.

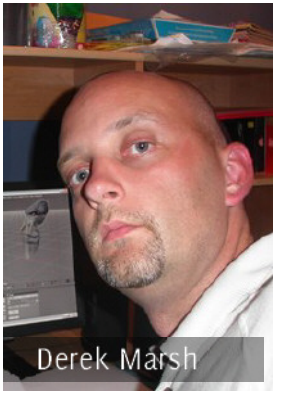
"**The Unsolved Mystery**" can be seen here: http://www.youtube.com/watch?v=yDrUtl5_2KU

Welcome to our next installment of "Meet the Blenderhead". As some of you may know, the last person interviewed is allowed to pick who they would like to see interviewed in the next issue. Eldron didn't have anyone specific and allowed me to pick whomever I wished. After some discussion with people in #blenderchat on IRC, we came to the conclusion that hey, why don't I interview myself?

With that decision made, I made the choice to allow the community to post questions at www.blenderartists.org for me to answer. No sense in me just talking about myself now, is there? I have taken eleven of the best questions posted within the thread and have endeavoured to answer them the best I can.

In my real life, I have been very happily married for almost eight years and a father of three. I am currently working as a sales manager for a company in Toronto, Ontario, Canada. I have been an active member of the Blender community for about 8-9 years now, (Ver. 1.8), when the old NaN was still around. Blender, for me, is my hobby. I love that I can still create things and have my work and knowledge appreciated by many people around the world. It is a great feeling. Though I currently don't have as much free time as I used to have to put into my Blender work, I still find time when I can to open Blender and play with some sort of a mesh. It's been one of the best experiences in my life, (other than getting married and watching my son being born – have to kind of say that!).

So, without any further ado, here is me!



The M.h.p.e.: *The well-known oldie: How did you get into Blender?*

BgDM: Oddly enough, at one of my old jobs, I was searching for a CAD program so I could open and edit AutoCAD files. We didn't have the funds at the time, small sales company, to purchase AutoCAD and I really needed this in order to do some of the work. After a lot of searching, I found a link to Blender and the old NaN forums. I was immediately awestruck with what I saw. I had never seen anything like this program before and the whole CG thing was still very new. I had seen "Toy Story", etc., and always wondered how that stuff was done. Then when I discovered Blender, I was like, "man, I have to get into this!" I downloaded Blender and started doing every single tutorial I could find. Most of the early tutorials were from B@rt's website. Every tutorial on his site, (which he still has up btw), were invaluable in the beginning. A lot of question asking in the old forums about how to do things have taken me to where I am today.

Dreamsgate: *What/who inspires your artwork?*

BgDM: I am inspired daily by all the users of Blender. Everyone who posts their work on any forum always prove to me that Blender is a very capable application. Some of my favorite users included @ndy, RobertT, Bassam, LohnS, Myke, Eldron, just to name a few.

As far as outside sources that inspire me, my family is always number one in that regard. They are very supportive of me in my Blender life. I can't ask for anything more from them.

Also, I scour the 2D artwork sections at CGTalk and my all time favorite site, www.conceptart.org/forums. The "It's Finally Finished" section there is one of the best resources for inspiration. My "Alien – A Portrait" image was based off of a concept by mellowsmooth, that I found there, (used with permission, of course). I highly recommend that you visit that site regularly for inspiration and concepts that you can take and turn into 3D.

Dreamsgate: *Do you find it hard to keep up with all the new features and tools that are added?*

BgDM: Features are being added at such a -

rate that I don't think anyone can keep up with everything. Even some of the old features that are getting new additions/tweaks, (i.e. particle system), have gone beyond what I ever thought they could.

With my current limited Blender time, I don't have the required time to learn these features. So in a sense, I am falling behind the curve. If I don't start taking the time to review these great new additions, I will fall too far behind. For now, things seem to be still OK for me. Most of the new features are for animation and other areas that I don't really use in my work-flow. That will however, definitely change down the road. So I either need to start keeping up, or be left in the dust.

I'm sure if I really needed one of the new features for a certain project, then I would take the time to research it and learn it properly. The sculpt tool is one of those features that I have taken the time to play with, as it is a very useful and beneficial tool in my work-flow.

Craigomatic: Having been featured in 3d World, has your CG experiences broadened in the professional sense, or allowed you to communicate in channels you weren't open to before? (Adoring fans, professional job offers, etc)

BgDM: Being featured in 3D World magazine has been my highest achievement during my time using Blender. I was beyond excited when I received that email asking to publish my "Alien – A Portrait" image. I almost deleted the email thinking it was a complete joke. Here I am, half way around the world from where the magazine is published and I get an email out of the blue. But, I responded and the rest is now published history! They even sent me a free copy of the issue, which I now keep stored away for future reflections, when I get old and cranky.

As far as offers and open doors, nothing has really happened as a result of that work being published. I have received offers to do work on open source games and other non-commercial work. But, since I have a real life, with a paycheck, it is very hard for me to accept these offers and to date I have not accepted any of them. That could change sometime down the road, if things ever get better for me with some free time.

I am always interested in seeing what people are working on, and if there is any interest in having me be part of the team, then please, feel free to drop me a line and I will definitely review the scope and consider the opportunity.

Craigomatic: How do you balance your time at the computer with your job and your personal time with your family, and still maintain enough time to serve as a moderator on the forum?

BgDM: My job allows me some freedom. During breaks, and lunch time, I get to surf and monitor the forums. Mostly, I spend time first thing in the morning reviewing threads and stuff. This is my quiet time and I get most of my regular daily work done then as well. Admin/Moderating the forum doesn't actually take up as much time as you would think. We have a great group of mods and admins that do a great job of maintaining the sanity there. They are all a great help. that are added?

My family, as I stated above, are very supportive of what I do. My son sits beside me while I surf the forums and he is always pointing at images and going "Wow daddy! Did you do that one?" And I am always answering, "No son. That's not mine." So he kind of has the bug a bit too. Just doesn't

Mystery: What was your most favorite project worked on?

BgDM: All of my projects are favorites of mine. To pick one though, is a tough choice. I would have to say that my "Sebulba" that I made 2-3 years ago has to be the most rewarding one that I have done to date. That model pushed me to learn proper edge loops and pushed my modeling skills to a new level. I can't even remember how many times I redid the ears on that model before I got them right.

Also, that model taught me so much about UV mapping and texture painting. TorQ was paramount in helping me get that thing unwrapped, when I knew absolutely nothing about UV mapping. At the time, I had given up texturing the model and posted the Blend file for everyone to use as they wish. (Some interesting animations came from that). Then TorQ got a hold of the mesh, provided a clean unwrap and then posted that Blend file back. I took that, tweaked that UV map some more and then proceeded to do the textures. Without that initial unwrap by TorQ, I would not be anywhere near the level of texturing that I am today. I owe him a lot for that effort back then. Ever since then, organic and creature modeling has been my most favorite thing to do in Blender.

Mystery: What hobbies do you have besides 3D?

BgDM: I love my job. It's fun for me. I get to travel around and see construction in its early stages and then look at those jobs that I have supplied material on and can say that I was part of the process. It's very rewarding.

Outside of work, I am very involved with my kids' lives. They are my hobby outside of Blender. During the winter months here in Canada, I coach both my son and daughters hockey teams. During the summer months, I coach my daughters' softball team. It's great fun watching kids improve and grow in front of your eyes and become more than they thought they could at the start of the season.

My entire family enjoys camping. We pack the van full with tents and sleeping bags and head north here in Ontario. It's great fun and everyone has a good time. I will be moving up there one of these days and retire from work to sit on my dock. Over look the lake and just take in the days. If any of you ever get the chance to visit Ontario, definitely take the time to head to the northern part. One of the most peaceful and beautiful places on the planet.

Alvaro: What is your advice for those Blenderheads that not always find time and/or motivation to start new projects?

BgDM: Tough question, because I run into this myself all the time. All I can really say is that when inspiration hits you, run with it. Even if you don't see the project through to it's final stages, you will no doubt learn something from what you have done. I have started more projects than I can count. With every one of them, I have taken something that has helped me on my next project.

The time thing is the biggest issue. When I get that inspiration to open Blender and I get into the rhythm and flow of the modeling process, it's great. Then something comes up and you have to stop. You lose that drive and that moment you were in at the time. It's sometimes very hard to get that back. Just be persistent in what you do and when something stops you from doing it, you just have to pick up from where you left off and try and find that place you were in again. You can do it, because I have.

Macouno: You give away pretty much every blender file you publish images from, what made you decide to do so, and do you think more people should, (since hardly anyone actually does that)?

BgDM: Blender has given me so much over the last years that I feel I have to give something back. I am no coder, so I can't help in the development process. I wish I could. But I'm too old and not patient enough to learn coding. So to me, giving the community some of my Blend files is a way for me to give back. It's also a way for others to learn and to see how someone else approaches a certain project. I may not be the best modeler, or the best at lighting, etc. But even if someone looks at the file and says, "Ah, now I get it!" that's all that matters. A Blend file is a great learning tool.

I would encourage every Blender user to post their Blend files for people to see. Even if it's to get some help on how to do something. It is an invaluable tool.

On the other hand, I do understand why people don't do it as well. You put a lot of hard work and time into something. You create a great piece that people appreciate. You want to keep that for yourself. It's yours. That is how I feel about my texture work. That is why I typically don't post my textures along with my Blend files. Textures to me are more art than the actual model itself. So those, I keep to myself. Also, I have to keep some of my trick up my sleeve as well.

Enriqolonius: Do you like moderating the forum? Do you wish sometimes you were just one of us "guys" again?

BgDM: There are definitely times when I sit at my comp, reviewing posts as an admin and think, "this is really a pain in the lower back side". Deleting spambots, PM'ing users warnings about conduct and other forum related stuff can be very boring and very tedious stuff. To be a regular forum user again would be great. No worries. No deleting threads, etc., etc.

Now, with that being said, the stuff that does need to get done really doesn't take up that much time, when you look at it in the grand scheme of things. There are many features implemented that help and as I said above, we have a great team of admins and mods that we all rely on. Being part of that team is rewarding.

Alltaken: Blender has been improving very, very quickly in terms of usability and functionality. If you could name one interface improvement which you have appreciated the most, and one interface annoyance which you would change if you could, what are they and what/how would you improve something

BgDM: To date, there really hasn't been any interface changes that I have come to really appreciate. There have been some general clean ups and reorganizing of some things, but nothing that really stands out, which is really a shame. It is the number one complaint that everyone has that tries Blender, newbs and industry people included. And since it has been the number one on everyone's list, I don't know why it hasn't been addressed to date.

I have used Lightwave for some time. That application has a great menu based system. You can click through it very quickly and get to the tool that you want in an efficient manner. That is one thing that I would like to see incorporated into Blender. Say in EDIT MODE, you have a menu system that only shows tools that can be used in EDIT MODE. Divided into Modeling tools with subsets, Editing tools divided into subsets, etc. It would have to be very well thought out and planned to get the efficiency required, but I found it very useful and easy in Lightwave.

Here is how!

1. We accept the following:

- Tutorials explaining new Blender features, 3dconcepts, techniques or articles based on current theme of the magazine.
- Reports on useful Blender events throughout the world.
- Cartoons related to blender world.

2. Send submissions to sandra@blenderart.org. Send us a notification on what you want to write and we can follow up from there. (Some guidelines you must follow)

- Images are prefered in PNG but good quality JPG can also do. Images should be seperate from the text document.
- Make sure that screenshots are clear and readable and the renders should be at least 800px, but not more than 1600px at maximum.
- Sequential naming of images like, image 001.png... etc.
- Text should be in either ODT, DOC, TXT or HTML.
- Archive them using 7zip or RAR or less preferably zip.

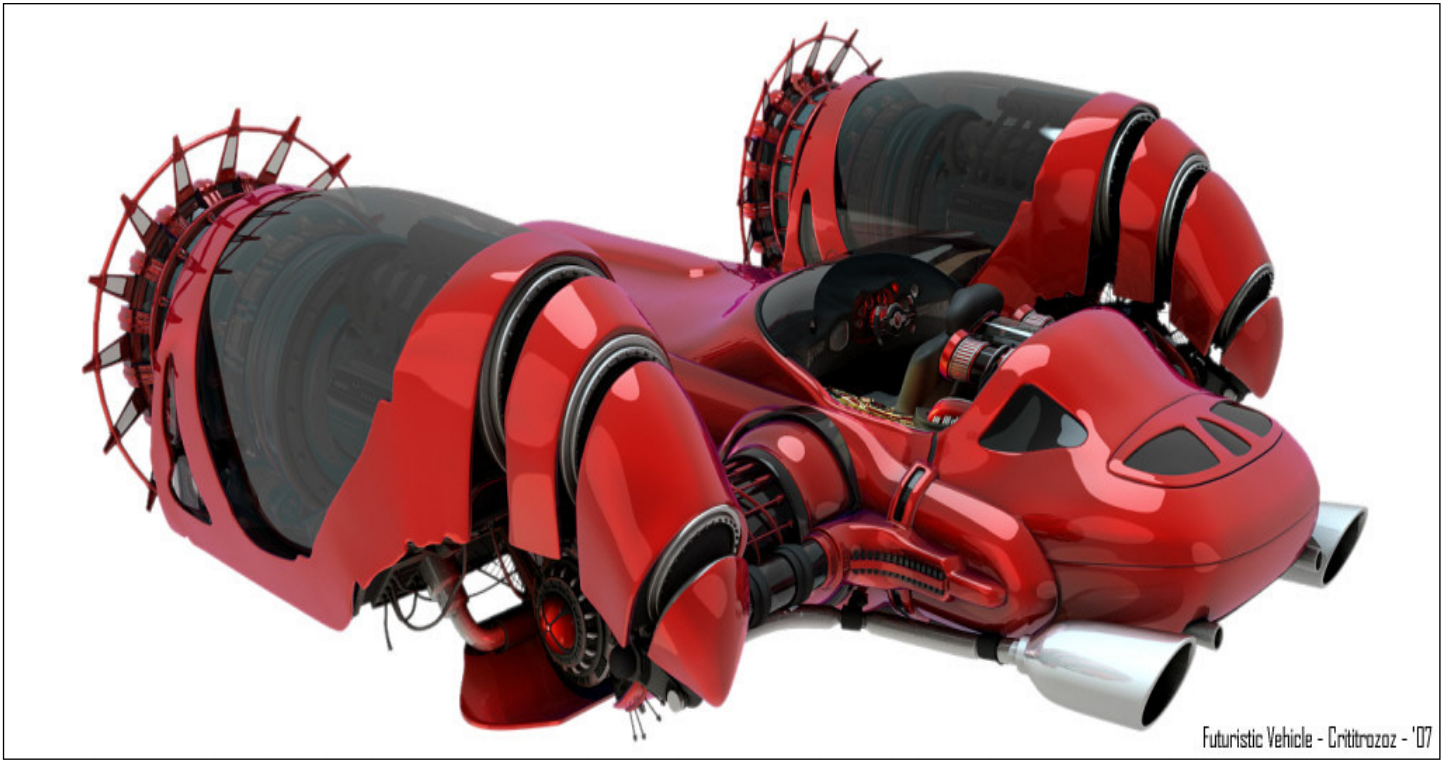
3. Please include the following in your email:

- Name: This can be your fullname or blenderartist avtar.
- Photograph: As PNG and maximum width of 256Px. (Only if submitting the article for the first time)
- About yourself: Max 25 w ords .
- Website: (optional)

Note: All the approved submissions can be placed in the final issue or subsequent issue if deemed fit. All submissions will be cropped/modified if necessary. For more details see the blenderart website.

Alejandro Chocano - BeeBot

Calvin Culy - Futuristic Vehicle



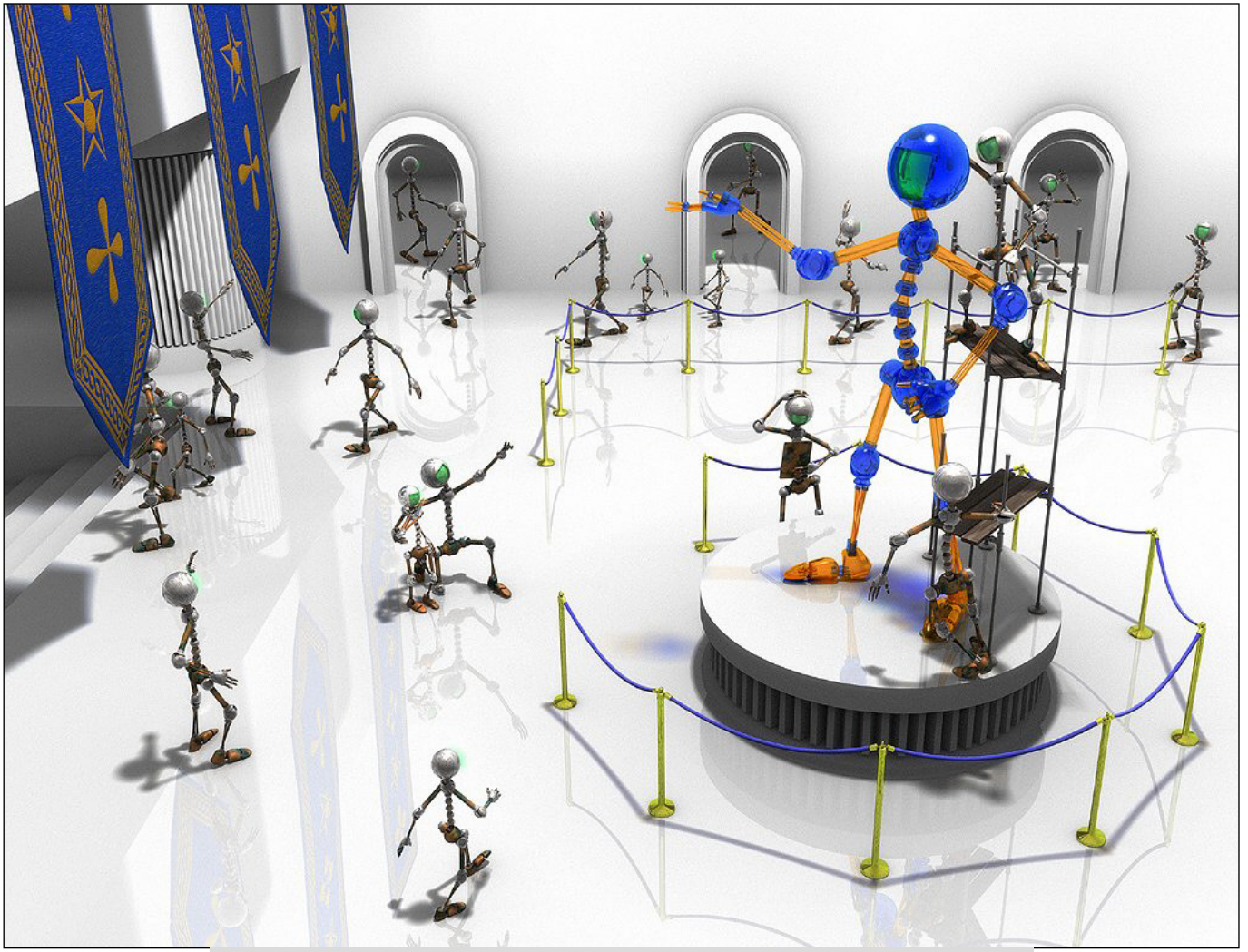
Calvin Culy - Futuristic Vehicle

Daniel Wray - KV Tank

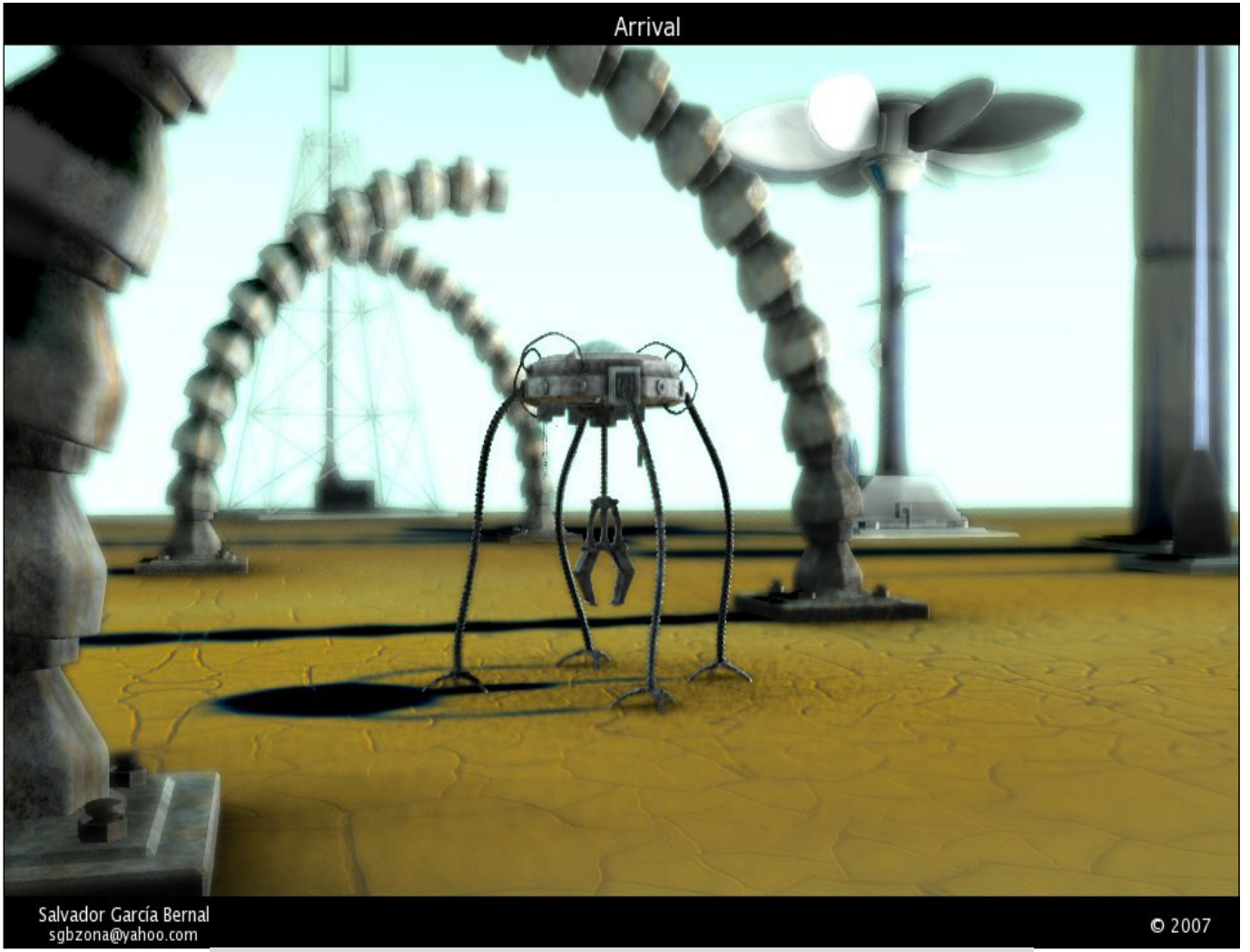
Marcin Szkup - Panzer IV

Mirek Jackow - ARV_WZT

Philippe Roubal - Cyclone 9 Motor



Roland Hess - Robo Museum



Salvador Gracia Bernal - Arrival

Issue#12 Sep 2007

Theme: Texturing

2D texture
Procedural texture
Nodes
And more...

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